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ABSTRACT

A survey of young physicians in rural areas was conducted and information was gathered from other data sources and analyzed for three main purposes: (1) to evaluate the retention of National Health Service Corps (NHSC) alumni in Health Manpower Shortage Areas (HMSAs); (2) to document the distribution of NHSC alumni, Private Practice Option (PPO) physicians, and non-NHSC physicians in rural areas; and (3) to examine the practice patterns (e.g., use of auxiliary personnel, fee structures, patient characteristics) of NHSC alumni, non-alumni, and recent PPOs. The major conclusion of the analysis was that the NHSC has had an impact on the distribution of physician services in rural areas. Young physicians who fulfill an NHSC obligation in a rural HMSA and who remain in rural practice are very likely to choose to practice in a HMSA. This is true even though NHSC alumni are less likely than non-alumni to have had any prior exposure to rural areas. In addition, NHSC alumni in HMSAs retain many of the practice patterns which are evident in NHSC sites and, consequently, may be more accessible to low income and working class populations in these areas. Numerous data tables supplement the text. An 11-page reference list and the study instruments are appended. (JHZ)

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Young Physicians in Rural Areas: The Impact of Service in the National Health Service Corps

Survey of Factors Influencing the Location Decision and Practice Patterns

VOLUME 2

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Preface

In September 1983 the Public Health Service began a study of factors influencing the location and practice patterns of young physicians who recently settled in rural areas. The purpose of the study was to obtain basic data on all young MDs and DOs in rural areas and to determine whether physicians who served in the National Health Service Corps exhibited different location choices and practice patterns from those who did not serve. The results of the study are contained in a two volume report prepared by the contractor, Mathematica Policy Research, Inc., on July 31, 1985.

The report is entitled "Young Physicians in Rural Areas: The Impact of Service in the National Health Service Corps, Volumes I and II." Volume I, "County Characteristics" describes the characteristics of the rural counties selected by all primary care physicians who graduated from medical school between 1974 and 1978. Volume II, "Survey of Factors Influencing the Location Decision and Practice Patterns", presents the results of a survey from a sample of these physicians conducted in the Fall of 1984.

This study builds upon the results of a previous study also conducted by Mathematica Policy Research, Inc., "Evaluation of the Effects of National Health Service Corps Physician Placements Upon Medical Care Delivery in Rural Areas." That study was completed in 1982 and the results were presented in a comprehensive summary report and in a series of 11 technical reports.

This project was supported by several organizations within the Public Health Service. In the Health Resources and Services Administration, these included the Office of Planning, Evaluation and Legislation (OPEL), the Bureau of Health Care Delivery and Assistance (BHCDA), and the Bureau of Health Professions (BHPr). Support was also provided by the Office of Health Planning and Evaluation of the Office of the Assistant Secretary for Health.

John Drabek of the Office of Data Analysis and Management, BHPr, served as Project Officer. Dan Calvin of the National Health Service Corps, BHCDA was the original Project Officer.

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EXECUTIVE SUMMARY

Overview of Study and Findings

The mission of the National Health Service Corps is to improve delivery of health services in Health Manpower Shortage Areas (HMSAs) by the appropriate placement of health professionals and health resources. This study was undertaken to determine:

- the characteristics of rural communities which are attractive to young physicians
- to what extent NHSC physicians have remained in the locations to which they were assigned after completing their service (NHSC alumni)
- the factors which influence young physicians' choice of a rural or HMSA practice location and, for NHSC alumni and non-alumni, whether these factors are different
- the practice characteristics of young physicians in rural and HMSA locations and whether these practice characteristics differ for NHSC alumni and non-alumni

Analyses were conducted using Area Resource File data on characteristics of rural counties and data on individual physicians' characteristics which were obtained through a survey of young physicians in primary care practice in non-metropolitan areas.

Major findings emerging from this study include:

- Rural counties which were most likely to gain a young physician were more populous and had more health resources; this finding is consistent with expectations based upon earlier studies of the geographic diffusion as the supply of physicians increases.
- In addition to population and health resources, the presence of a college, greater white collar employment, and less farm population were factors which were associated with the ability of rural counties to attract young physicians. However, NHSC alumni located in counties that had lower population density, were less likely to have a hospital, and were more likely to be whole county HMSAs.

- Of those alumni who located in a rural area after completing their NHSC service, over 70 percent remained in the site to which they were assigned. Since NHSC alumni report fewer prior contacts with rural areas than non-alumni, there seems to be considerable evidence that the NHSC experience has a strong effect on subsequent location decisions of alumni. This is also suggested by the fact that the analytic results indicate that satisfaction with aspects of the NHSC experience is associated with HMSA location choices.

- Analysis of practice patterns of NHSC alumni and non-alumni in rural areas reveals comparable work loads. However, NHSC alumni are more accessible to the underserved--seeing more Medicaid patients, using sliding fee scales and discounts more frequently and accepting assignment for Medicare claims more often. These differences are particularly pronounced for alumni who are in HMSA locations. Some of these differences may be due to differences in the measurable and unmeasurable characteristics of the two groups of physicians, but the results are also consistent with the impact of their NHSC service since we have observed similar practice patterns in the previous studies of NHSC service.

- The practice patterns reported by NHSC physicians serving under the Private Practice Option (PPO) are consistent with prior expectations. PPOs see slightly fewer patients than other physicians, perhaps because they are less experienced and established than the other physicians. However, because the NHSC program has evolved so substantially in recent years it may be difficult to generalize from data on PPO physicians who selected locations in the summer of 1983 or earlier.

Purpose of This Study

The purpose of this study was to answer several specific questions about the effect of the NHSC on the geographic location and practice patterns of alumni:

- Of NHSC alumni practicing in rural areas, what proportion remained in the rural area where they completed their NHSC service?

- Of all young physicians graduating between 1974 and 1978 who have chosen primary care practice in a rural community, what factors influenced the choice of a specific community? Are there detectable differences in the

factors which influenced the location choices of NHSC alumni and non-alumni?

- Do the practice characteristics of NHSC alumni appear to have been influenced by their exposure to the NHSC? Do alumni and non-alumni report different practice characteristics?

- What characteristics of rural communities distinguish counties which are attractive to young physicians from those counties which do not attract physicians? Are rural counties which are attractive to NHSC alumni different from counties which are attractive to non-alumni?

It is anticipated that the results of this evaluation will assist the Health Resources and Services Administration in its efforts to adapt the NHSC program in the current market environment characterized by increasing physician supply and stronger competitive pressures influencing new physicians' location patterns. Therefore, the focus of this evaluation has been on identifying information which HRSA may use in selecting, placing, and monitoring the practice characteristics of NHSC physicians in order to increase retention and to provide services to areas least likely to obtain physicians' services independently.

Findings: Characteristics of Rural Communities Which Gain Young Physicians

The study of the characteristics of rural counties which gained or failed to gain young physicians examined location choices of all physicians who graduated from allopathic and osteopathic schools of medicine between 1974 and 1978 and were practicing in a primary care specialty in 2,111 rural counties in 1983. First, the characteristics of counties in which young physicians were located were compared with the characteristics of counties which failed to attract young physicians and significant differences were identified. The 1,228 gaining counties tended to have more population, higher population growth rates, greater population density, a better educated population, higher income, less agriculture, and more health resources than the 883 counties which did not gain a physician.

Even among the counties that gained young physicians there were differences. NHSC alumni tended to choose areas that had smaller populations, lower population density, lower income levels, higher unemployment rates, fewer health resources, and less health care utilization when compared with the areas selected by non-NHSC physicians. About 81 percent of the counties where NHSC alumni practice were designated as Health Manpower Shortage Areas (either whole or part county HMSAs), as compared with 53 percent of the counties which attracted non-NHSC physicians. In about 5 percent of the counties that gained young physicians, an NHSC alumnus was the only young physician to establish practice there.

These descriptive findings were used to guide the multivariate analysis of the impact of specific community characteristics on the probability that a young physician would locate in a specific county, and the interrelationships of groups of variables. Results of the multivariate analysis suggest that counties are more likely to be attractive to young physicians, in general, when they have:

- o Greater population
- o More physicians
- o A college
- o Greater white collar employment
- o Less farm population

A somewhat different set of factors are associated with the counties which are selected by NHSC alumni. The probability that an alumnus will locate in a county is related to:

- o Lower population density
- o Higher per capita educational expenditures
- o No hospital
- o Lower farm population
- o Whole county HMSA designation

Although population and physician-to-population ratio are positively associated with the alumni's location choices, the magnitude of the effect is much less than for non-NHSC alumni choices. These findings suggest that there are differences between the counties selected by NHSC alumni and non-alumni and that, for NHSC alumni particularly, factors other than the characteristics of communities appear to intervene in the location decision. It seems likely that the NHSC service, itself, is one of those intervening variables.

Individual Physicians' Location Choices

Using data obtained through a survey of 1974-1978 graduates of allopathic and osteopathic schools of medicine who were located in rural areas and were practicing as primary care physicians, the factors which influenced their choice of location were examined descriptively and using multivariate techniques. A major finding of the descriptive analyses is

that NHSC alumni located in rural areas report substantially fewer prior contacts with rural areas than do non-alumni; osteopathic physicians report the highest number of prior contact events.

Results of the multivatiate analysis of young physicians' location choices indicate that the NHSC experience has affected the choices of NHSC alumni. Although alumni have fewer prior contacts with rural areas, the rural NHSC experience often immediately precedes the permanent location decision and, consequently, may exert a particularly strong influence. This is suggested by the fact that satisfaction with aspects of the NHSC experience is positively associated with a decision to choose rural and HMSA practice. It is also noteworthy that, for alumni, organized community recruitment efforts are reported to have a significant positive effect on the decision for HMSA practice.

Analysis of Young Physicians' Practice Patterns

The focus of this study area was to determine whether the practice patterns of NHSC alumni are different from, or similar to, the practice patterns of young physicians who did not serve in the NHSC. In addition, the practice characteristics of Private Practice Option physicians while fulfilling their NHSC obligation in 1984-85 were examined. Data for this analysis were obtained through the survey of young physicians conducted between October 1984 and January 1985.

Results of the comparison of practice patterns indicate that there are differences between NHSC alumni and non-alumni. Alumni practice patterns include:

- higher proportions of patients from whole HMSA counties
- more Community Health Center and Migrant Health Center practice
- greater use of nurse practitioners
- more evening practice hours
- more Medicaid patients
- higher rates of acceptance of assignment for Medicare claims
- more frequent use of sliding fee scales and discounts of fees.

These differences, however, do not appear to be wholly attributable to the NHSC experience. NHSC alumni are somewhat more likely to be in general and family practice, are less frequently board certified, much more likely to

practice in a HMSA, and are underrepresented in the South and overrepresented in the West, compared to non-alumni. These differences between the two groups may explain a substantial portion of the practice characteristics differences observed.

Physicians who practice in non-HMSAs exhibit similar practice patterns whether or not they served in the NHSC. However, differences are observed in the practice patterns of alumni and non-alumni who practice in HMSAs. Evidently, for alumni who remain in HMSA practice, some Corps effect appears to have influenced their subsequent practice patterns.

When the practice patterns of recent PPOs are examined, the findings indicate that:

- While 16% were in Community Health Centers or Migrant Health Centers, the majority of PPOs are in solo and partnership/group practice arrangements.
- PPOs see fewer patients, on average, than do NHSC alumni and non-alumni, but report working more hours.
- About 20 percent of patients seen in all settings are Medicaid beneficiaries.
- PPOs in MHCs see the largest number of patients and work the longest hours.
- Nearly 80 percent of PPOs are GP/FP physicians; the remainder are IM and PD physicians.
- There is little difference between board certified and non-board certified PPOs in practice characteristics.

However, these results must be viewed with caution since the PPOs surveyed were in practice prior to January 1984. Substantial changes were made in the NHSC placement program in 1984. Consequently, current PPOs and PPAs may exhibit different practice patterns.

I. INTRODUCTION

A. BACKGROUND

The mission of the National Health Service Corps (NHSC) program is to improve the delivery of health services in Health Manpower Shortage Areas (HMSAs) by the appropriate placement of health professionals and health resources. The purpose of this study was to evaluate the retention of NHSC physician alumni in Health Manpower Shortage Areas, to document the distribution of NHSC physician alumni, Private Practice Option (PPO) physicians, and non-NHSC physicians, and to examine the characteristics of rural communities which have attracted NHSC and non-NHSC physicians over the past decade. In addition, this evaluation has examined the practice patterns (e.g. use of auxiliary personnel, fee structures, patient characteristics) of NHSC alumni, recent PPOs, and non-alumni in rural practice.

It was anticipated that the results of this evaluation will be of considerable assistance to the Health Resources and Services Administration in its efforts to refine and refocus the NHSC program in the current market environment characterized by increasing physician supply and stronger competitive pressures influencing new physicians' location patterns. Therefore, the focus of this evaluation has been on identifying information which HRSA may use in selecting, placing, and monitoring the practice characteristics of NHSC physicians in order to increase retention and to provide services to areas least likely to obtain physicians' services independently.

B. MAJOR EVALUATION ACTIVITIES

In order to address the evaluation issues identified by HRSA, four major categories of research were undertaken:

1. Descriptive profiles of rural and HMSA communities which lost, retained, and/or attracted young physicians. The purpose of this analysis was to identify characteristics of counties which are associated with the location patterns of young physicians, in order to guide the analysis of decisions and the development of a methodology for classifying counties by the probability of attracting a young physician. The characteristics of communities in which young physicians located were compared with the characteristics of those communities which failed to attract young physicians, and significant differences were identified.

2. Multivariate analysis of the influence of community characteristics on the probability that counties will attract young physicians. The objective of this analysis was to examine the impact of specific community characteristics on the probability that a young physician would locate in a specific county, as as well as to better understand the interrelationships of groups of variables which are associated with a community's attractiveness. The results of the analysis can be used to develop a classification system to identify rural counties which have a high or low probability of gaining a young physician.

3. Descriptive and multivariate analyses of individual physicians' location choices. Using data obtained through a survey of 1974 - 1978 graduates of allopathic and osteopathic schools of medicine who were located in rural areas and were practicing as primary care physicians, the factors which influenced their choice of location were examined descriptively and using multivariate techniques. Specific analytic emphases included:

   -- descriptive analysis of personal and professional characteristics of young physicians which are associated with location choice patterns

   -- analysis of the stated preferences of young physicians and associated location choices

   -- examination of the effect of prior contacts with rural areas on the location choice

   -- multivariate analysis of factors which influenced decisions
      a) to locate in urban, rather than rural, areas,
      b) to locate in HMSA rather than non-HMSA areas; and
      c) for NHSC alumni, to locate in the NHSC site to which they were assigned or to choose another location

4. Descriptive analysis of young physicians' practice characteristics. The focus of this study area was to determine whether the practice patterns of NHSC alumni are different from, or similar to, the practice patterns of young physicians who did not serve in the NHSC. In addition the practice characteristics of Private Practice Option physicians while fulfilling their NHSC obligations in 1984-85 were examined.

Results of the descriptive profiles of communities and of the multivariate analysis of community characteristics are reported in Volume I: Community Profiles and Analysis of Community Characteristics of this Final Report. The results of the latter two analyses are presented in this volume of the Final Report.

Chapter II of this report is a comprehensive review of the literature on physicians' location decisions and on factors which have been identified as influencing these decisions and includes a discussion of hypotheses which have guided the analytic work of this evaluation. Chapter III summarizes the descriptive and multivariate analyses of individual physicians' location decision. Chapter IV presents the findings of the descriptive analysis of the practice characteristics of young physicians, for NHSC alumni, non-alumni, and PPO physicians. In Chapter V, major findings of the research areas reported here are highlighted and summarized.

C. MAJOR DATA SOURCES

To address the variety of evaluation issues of interest, it was necessary to draw upon a number of data sources as well as to conduct primary data collection. These data sources include:

- A survey was conducted of young physicians who graduated from medical school between 1974 and 1978 and who were in a primary care practice in a rural area*. This survey was conducted between October 1984 and January 1985.

- Data on current locations of all 1974 - 1978 graduates of allopathic and osteopathic medical schools, in primary care practice in non-metropolitan areas, were provided by the American Medical Association and the American Ostoepathic Association. Practice locations of NHSC alumni and PPOs were obtained from the National Health Service Corps.

- Secondary data sources used in the analyses included: the Area Resource File, the City and County Data Book, and selected NHSC data sets.

Each of these data sources is described in detail in the sections of this report in which they were analyzed.

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*One group of survey respondents included urban physicians, also; these physicians had been surveyed in 1979 during an earlier study of the NHSC.

D. LIMITATIONS OF THIS EVALUATION

Although the analyses conducted during this evaluation are complete and highly focused on the issues identified by the Health Resources and Services Administration, it is important to recognize that this project was not intended to be a comprehensive evaluation of the National Health Service Corps. Instead, it was structured to answer several limited questions:

- o What proportion of NHSC alumni practicing in rural communities, who fulfilled their NHSC obligation in a rural area, remained in that rural area after completing NHSC service?

- o Of all young physicians graduating between 1974 and 1978 who have chosen primary care practice in a rural community, what factors influenced the choice of a specific community? Are there detectable differences in the factors which influenced the location choices of NHSC alumni and non-alumni?

- o Do the practice characteristics of NHSC alumni appear to have been influenced by their exposure to the NHSC? Do alumni and non-alumni report different practice characteristics?

The answers to these questions provide considerable information on the impact of the National Health Service Corps in increasing the permanent availability of medical care to residents of non-metropolitan areas. This evaluation does not address, however, the broader issue of overall NHSC alumni retention in Health Manpower Shortage Areas.

Two other limitations should also be noted.

(1) PPOs who were included in this study began fulfilling their NHSC obligations prior to 1984. Subsequent to that time, there has been considerable change in the guidelines for PPO practice and in the HMSA opportunity list. Consequently, the location patterns and practice characteristics of 1984 and later PPOs may be quite different from the findings reported here for PPOs.

(2) The analysis of location choices and practice characteristics of individual physicians exclude those survey respondents who located in part-HMSAs, when comparisons were being made between HMSAs and non-HMSAs, because there is insufficient information on the within-county locations of individual physicians to determine whether they are in a HMSA or non-HMSA area.

Within these limitations, this evaluation provides much new information on location choices and practice patterns of young physicians.

II. PRIOR RESEARCH AND HYPOTHESES

A. DETERMINANTS OF PHYSICIANS' LOCATION DECISIONS: A REVIEW OF THE EVIDENCE, WITH SPECIAL ATTENTION TO THE EFFECTS OF COMMUNITY CHARACTERISTICS AND OF MARKET FORCES

1. Overview

Physicians' location decisions and factors affecting those decisions have been studied and discussed intensively for the past two decades. As a result, there are literally hundreds of citations which are referenced in this literature. To provide a foundation for the design of a comparative evaluation of NHSC alumni retained in HMSAs, however, only a subset of this literature was examined:

- o studies of individual physician's decisions to locate in rural or shortage areas
- o studies examining the distribution of the stock of physicians across rural and urban areas
- o studies of flows of physicians into and out of rural and urban areas over time.

Research that focuses on intraurban distribution patterns or on the distribution of physicians by state, cross-sectionally or over time, was not of interest for this study.

The emphasis in this review of the literature is on three categories of factors which may influence location decisions:

1. Individual characteristics of the physician
2. Characteristics of the community
3. Market characteristics

In the sections which follow, we review the evidence on the factors, within each of these categories, which have been found to be associated with location decisions of physicians. A final section considers the evidence on factors influencing decisions by NHSC and non-NHSC physicians to locate in shortage areas and rural areas.

2. Individual Characteristics

Much of the research on physicians' location decisions has concentrated on identifying individual characteristics of the physician which are associated with the decision to locate in a rural or urban area. The major classes of individual characteristics investigated include:

- o prior contact factors
- o background traits
- o professional factors
- o spouse's background and other family influences

Each of these areas is dicussed in this section.

Prior contact factors

A number of studies examine the relationships between physician location decisions and prior exposure to the area of choice. The basic hypothesis tested in these studies is that the greater the number of prior contacts with an area, the higher is the probability that a physician will locate an initial practice in that area. Prior contact events examined include birth, high school, medical school, and internship/residency. Results of these studies have indicated that prior contact factors do have a positive effect on the probabilities of location and that more recent events (i.e. internship/residency) have a stronger effect than do more distant in time events (Held, 1973; Weiskotten et al., 1968; Fein and Weber, 1971; Yett and Sloan, 1974; Budde and Langwell, 1978; Cooper et al., 1975; Cordes, 1978; Grimes et al., 1977; Werner, Wendling, and Budde, 1979; Samuels, 1974; Korman and Feldman, 1977; Hynes and Givner, 1983). The available evidence suggests that the greater is the number and duration of prior contacts, the more likely is the physician to establish his/her practice there. While the prior contact research has focused on establishing the strength of the observed relationship, Yett and Ernst (1975) consider a number of avenues through which prior contact enters the location decision process:

- o Due to the costs of obtaining information, the physician is able to be informed about the economic, medical, and social aspects of only a few locations, among them those with which he/she has had prior contact.
- o Previous contact with an area may have a direct effect on the physician's income potential if professional relationships are of use in establishing a new practice.

- Prior contact may be closely related to the physicians' investment in family or social relationships.

Yett and Ernst also stress that the observed relationships between prior contact and location decisions do not imply the direction of causality; physicians with strong location preferences may choose medical school and internship/residency location to facilitate the planned location decisions.

The major issue with respect to the prior contact hypothesis and rural/shortage areas is the fact that physicians choosing rural practice locations are more likely to have had prior contacts with the area, than are physicians choosing urban locations, and to have completed both medical school and intership/residency in the state in which they eventually located.

Background Traits

Background characteristics of physicians include socioeconomic status of family, age, sex, nationality, marital status, place of rearing. The latter trait is clearly related to the prior contact hypothesis, while other factors may be associated with the physician's attitude toward locations of specific types.

Rural upbringing has been found in a number of studies to be strongly associated with rural location decisions (Hassinger, 1963; Schaupp, 1969; Champion and Olsen, 1971; Korman and Feldman, 1977; Hynes and Givner, 1983; Hassinger et al., 1979), although most of the studies conducted are descriptive in nature. Werner et al. (1979) found that rural rearing is strongly predictive of rural practice location, but less strongly associated with the decision to practice in shortage areas.

Family socioeconomic status has been examined, primarily descriptively, to determine whether physicians from upper middle class or professional families are more likely to choose urban practice locations. Hassinger (1963) reports that the occupational status of fathers of rural physicians was lower than for urban physicians; however, nearly 2/3 of physicians in most rural areas were from farm families. Other studies support this finding, indicating that physicians from lower socioeconomic background were less likely to specialize and enter urban practice (Champion and Olsen, 1971). Yett and Ernst (1975) suggest that the linkage between family socioeconomic background and location decision may be a consequence of the fact that professionals and high socioeconomic backgrounds are more often found in urban areas; the causal relationship may be with place of rearing rather than family socioeconomic level. Additionally, physicians from families of high socioeconomic status may have sufficient sources of income to permit them to enter a subspecialty which is not ordinarily practiced in rural areas because it requires a substantial threshold population.

Little research has been conducted on the influence of the sex of the physician on location decisions. The general economic literature

suggests that women professionals are less likely to locate in rural areas due to the necessity of selecting a location that maximizes a joint family utility function (Frank, 1975). Langwell (1980) reports that women physicians who entered a first year residency in 1968 were less likely to choose non-urban practice; only 6 percent of women physicans were located in non-SMSAs by 1975, compared with 12.6 percent of the men.

Foreign medical graduates' location decisions have been examined in a number of studies; in the 1970s they represented over 30 percent of new licentiates each year. Butter and Schaffner (1971) found that FMGs are more likely to locate in areas with relatively high physician-to-population ratios. Budde and Langwell (1977) report similar findings for new Illinois FMGs, but also report that new FMGs in Illinois were disproportionately likely to locate in rural areas and urban areas, but less likely to locate in the more attractive suburb and small town practices. Other studies have supported this tentative findings with respect to FMGs. Korman and Feldman (1977) collected data from physicians who recently located in three rural counties in New York. Of these 60 physicians, 31 were FMGs. Madison and Combs (1981) similarly report that FMGs were heavily represented among young physicians who settled in the most rurual communities between 1973 and 1976.

Professional factors

Included in this category are the physicians' specialty, board certification status, and his/her attitude toward professional development and opportunities. Specialty of the physician is obviously strongly associated with location choices and constraints. Werner and Wendling (1979) use a simultaneous logit model to examine the interactions between location choices and specialty choices and find that, although the specialty choice is not significantly influenced by location choice, the location decision is significantly affected by the specialty choice. Langwell (1979) examines economic incentives to the joint specialty and location decison to physicians and reports that primary care specialists (i.e., internists and pediatricians) earn substantially higher lifetime earnings if they locate in rural areas. The choice of specialty, then, may affect the location decision through varying economic opportunities to specific specialties across urban and rural markets.

The physician's attitude toward professional opportunities has also been cited as an influential factor in location decisions. Cooper and Heald (1975) indicate that physicians who were very concerned about availability of continuing education opportunities were less likely to choose rural practice (where access to continuing education may be more difficult). Concern about excessively long work hours and the lack of other professional contacts and consultations has been cited as a particular concern for rural physicans (Bible, 1970; Heald et al., 1974). Similarly, interest in locating a practice close to a medical school suggests an urban, rather than rural, decision (Steinwald and Steinwald, 1974; Heald et al., 1974).

Spouses' Background Traits and Attitudes

Several studies have examined the role of the spouse in the location decision of physicians. In general, a positive relationship between spouse's place of rearing and the physician's choice of practice location has been observed (Schaupp, 1969; Taylor et al., 1973; Heald et al., 1974). Heald et al. report that among 144 physicians in rural practice in their sample, 44 percent had wives of rural upbringing. Most studies suggest that the wife's location preferences do not strongly influence the choice of a practice location (Charles, 1971; Cooper et al., 1975; Schaupp, 1969; Steward, Miller, and Spivey, 1980).

3. Community Characteristics

While it is evident that urban areas are more attractive to most physicians than are rural areas, there is a wide spectrum of community characteristics which make specific rural communities more or less attractive to physicians. These characteristics of non-metropolitan communities may be classified into several categories:

- o professional characteristics
- o socioeconomic characteristics
- o recreational, cultural, and climatic characteristics.

Much of the research which has been conducted on physicians' decisions to locate in rural areas has been attitudinal; physician respondents rank community characteristics by level of influence on their decision or simply indicate whether the characteristic was or was not an influence on their decision. A few studies have included specific area characteristics as variables in explanatory models; however, the absence of data to measure many community characteristics of interest severely restricted these approaches.[1] The major problem with attitudinal research is that it offers no mechanism for measuring tradeoffs between different factors (e.g. how much income would the physician be willing to give up to gain additional cultural opportunities?) In addition, examining responses across surveys is difficult since the phrasing of alternatives, interpretations, and subjectivity of responses limits comparability.

Professional Characteristics

The professional characteristics of major interest to physicians considering rural practice are:

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[1]Prior to development of the Area Resource File in its present form.

- opportunities for interaction and support with colleagues
- presence of hospital facilities and supporting services
- extent of unmet demand for health care in the area
- income opportunities

Colleagues. A number of studies (Bible, 1970; Heald et al., 1974; Steinwald and Steinwald, 1974; Werner et al, 1979) report that rural physicians or those considering rural practice are particularly concerned about professional isolation. The receptivity of established physicians to the possibility of a new entrant in the market may influence the decision to locate (Fein, 1956; Korman and Feldman, 1977; Parker and Sorenson, 1978). Interaction with colleagues is important for several reasons: maintaining knowledge of medical progress, securing practice coverage to permit uninterrupted leisure time, and availability of consultations on complex cases (Heald et al., 1974; Steinwald and Steinwald, 1974; Woolf et al., 1981; Evashwick, 1976).

Of particular significance for rural and shortage area practice is the recent trend toward group practice of physicians. Sloan (1974) indicates that physicians who join groups are strongly attracted by the regular hours, freedom from managerial tasks, and continual access to colleagues for referral and consultation. Heald, et al. (1974) report that the "opportunity to join a desirable partnership or group practice" was the most frequently cited factor influencing the location decisions of young physicians. Evashwick (1976) finds that a major contribution to explaining percentage change in the physician-to-population ratio in rural areas between 1960 and 1970 was the opportunity for group practice.

Facilities. Hospital facilities have been found to be strongly associated with the location decisions of specialists, but have less impact on location decisions of primary care practitioners. Thus, rural location decisions are affected by the presence or absence of hospital facilities, but the absence of a hospital does not prohibit physician location (Fein, 1956; Bible, 1970; Heald et al. 1974; Steinwald and Steinwald, 1974). Wacht (1972) estimates the impact of hospital facilities on rural physician location patterns and finds that general practitioners are not influenced by absence of hospital facilities. Yett and Ernst (1975) suggest that the Hill-Burton program may have had a role in attracting new physicians to rural areas, but evidence on this issue is mixed. They suggest, however, that technological progress over the past two decades has been rapid, and young physicians, trained in this technology, may be more reluctant than were past graduates to choose rural practice without hospital facilities.

Unmet Need. Physicians choosing rural practice location are more likely to indicate that they are interested in providing services to populations with unmet need for medical care (Heald et al., 1974, Stamps and Kuriger, 1983). Unmet need for services does not necessarily imply

that adequate demand for services is present to support a physician's practice since the population may not have the financial resources to pay for needed services. Unmet demand, however, is difficult to disentangle from economic factors, since physicians locating in areas with high unmet demand are able to rapidly establish a full practice and generate a high volume of receipts. Werner et al. (1979) report a stronger association between interest in unmet need and rural practice than with shortage area practice location.

Economic Factors. Included within this category are such considerations as income opportunities, hours worked, the cost of establishing a practice, and related factors. A number of studies have focused on income opportunities of physicians in rural and urban areas. Langwell (1979) estimates rates of return to the joint specialty and location choice of physicians and reports that general/family practitioners' income opportunities are greatest in urban areas. Indeed, in urban areas GP-FPs exhibit greater earning potential than do specialists of all kinds. Since GP-FPs are expected to be the major source of medical services in rural areas, this finding is of concern. A related study of economic incentives facing GP-FPs making location decisions reports substantially higher income opportunities for GP-FPs choosing the largest SMSA locations (Langwell and Budde, 1978). Werner et al. (1979) find no significant relationship between the physicians' expressed interest in income potential and the location decision for either shortage-nonshortage area choices or rural-urban choices. Other attitudinal surveys find that physicians acknowledge that income potential is an important factor in their location decision. Heald et al. (1974) report that nearly 20 percent of respondents ranked "income potential" among the three most impostant of all factors. Stamps and Kuriger (1983) report that, of current NHSC physicians, a significantly larger number of those planning to choose an urban location indicated that "income potential" was a factor in their decision. Korman and Feldman (1977) report that, of 60 physicians settling in rural areas of New York, 52 percent were given income guarantees by the communities.

Several of the income studies cited above have included hours of work in the analyses reported. There is considerable evidence that physicians in rural practice work more hours per week than do physicians in urban areas (Yett and Ernst, 1975, Kehrer et al. 1982). Langwell and Werner (1980) examine, jointly, income and hours of work in rural and urban areas. They conclude that the current distributions of physicians among locations and specialties are more consistent with a decision to minimize hours worked than with a decision to select a location to maximize income. Attitudinal research findings indicate that the expectation of long hours and overwork influences physicians away from rural and shortage area practice (Crawford and McCormack, 1971; Bible, 1970; Parker and Sorenson, 1978).

Overall, the evidence on the role of economic factors on location choices of new physicians is mixed with respect to rural choice incentives. While income potential may be relatively similar, after cost of living adjustment, hours of work and hours on call are greater. On the other

hand, it is possible that in areas with unmet demand (assuming ability to pay as well as awareness of need), young physicians may be able to establish a mature practice in a much shorter time than in better-supplied areas.

Socioeconomic Characteristics of the Community.

The characteristics of the population in the geographic area being considered as a practice location site by a young physician are important from two perspectives:

1. These characteristics are associated with "tastes" for medical care, health status (need), and ability to pay for services obtained.

2. In rural areas, the physician is choosing both a practice location and a home for his/her family.

The practice location decision and personal location decision are more closely tied in rural areas than in urban areas where a physician may practice in an inner-city location but live in upper middle-class suburbs.

Socioeconomic characteristics which have been examined in studies of physician location include:

- population size
- per capita/per household income
- age distribution of the population
- educational level of the population
- racial composition of the population

In the literature on demand for physicians' services, each of these characteristics has been found to be associated with demand. The aggregate demand for services should increase with population size, income, proportion of elderly and young, educational level, and proportion of whites in the populaion. Similarly, since physicians come from families which are disproportionately white, upper middle income, professional, and well educated (Hassinger, 1967) it is reasonable to assume that, on average, physicians will prefer to locate their homes in areas where the population has such characteristics.

The studies which have examined this issue quantitatively tend to support this view. Steele and Rimlinger (1965) report that population increase is one of the most iinfluential factors in attracting new

physicians; Marden (1966) reports similar results. Neither find that income, educational level, or racial composition of the population was a significant factor in explaining movement of physicians into areas over time. Dougharty (1970) finds physician income relative to average per capita income is a significant factor in explaining the distribution of physicians by county within a state. Hambleton (1971) reports that changes in per capita income are positively associated with changes in specialist and GP supply; GPs are attracted by a large over-65 population and are less likely to locate where the nonwhite population is large. Blair (1975) and Wacht (1972) report that physicians (except for GPs) are attracted both to areas with higher per capita incomes and areas with higher proportions of families below the poverty level. A recent study by Langwell et al. (1983) examined changes in the distribution of specialists over time among counties and found that population increases were the major predictor of increase in physician supply. However, per capita income increases were also significantly related to increase in the supply of physicians. Parker and Sorenson (1978) report that, for 68 physicians who left rural practice in upstate New York, "Social reasons" were the second most common cause. Woolf et al. (1981) examine HMSAs unable to attract a physician and conclude that areas with low income, low education levels, and fewer white collar workers were unable to attract a volunteer physician.[1]

Attitudinal research indicates that physicians are attracted to areas which offer educational facilities which are of high quality (Grimes et al, 1977; Werner et al, 1979; Stamps and Kuriger, 1983; Heald et al, 1974). This factor has been most frequently reported as of substantial importance to the physician and, presumably, reflects concern about family location impacts rather than professional location impacts.

Recreational, Cultural, and Climatic Variables.

A few quantitative studies have specified variables which "capture" the impact of recreational, cultural, and climatic factors of physicians' location decisions. These include:

- Hambleton (1971) who found that, while specialists are attracted to areas with relatively high numbers of tennis courts, GPs are repelled.
- Sloan and Yett (1974) who report that all physician specialists are attracted to areas in which the number of days of pleasant weather annually is higher.

The quantitative evidence on the effect of recreational, cultural, and climatic factors on physicians' location decisions is relatively weak,

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[1]This study was a limited examination of the placements of volunteers for the NHSC.

probably because of the difficulty in specifying proxies for these factors and because these may often be secondary determinants of location decisions.

Attitudinal research addresses these issues extensively. Findings suggest that:

- Cultural opportunities were a factor in influencing physicians to reject rural practice (Bible, 1970; Heald et al, 1974; Parker and Tuxhill, 1967; Grimes et al, 1977; Stamps and Kuriger, 1983);

- Recreational and sports opportunities were a positive influence on rural location decision (Stamps and Kuriger, 1983; Grimes et al, 1977)

- Climate (or geographical features) of the area was a major factor in physicians' location decisions in some studies (Stamps and Kuriger, 1983; Heald et al., 1974; Steinwald and Steinwald, 1974).

These findings suggest that rural communities with attractive recreational facilities and climate or geography may be more successful than others in attracting new physicians. The strength of this relationship is unknown, however.

4. Market Characteristics

The purpose of this section is to focus specific attention on the role of competitive environment on physicians' location decisions. We have considered local aspects of competitive environment in earlier sections of this review of the literature when we examined the effect of income opportunity perceptions and availability of collegial support. Clearly, by definition, a shortage area has relatively few physicians to provide services to the population in the market area and, therefore, competition among physicians for patients in these areas is not an issue of particular interest. However, extent of competition among physicians in the health care system, as a whole, has substantial implications for location patterns of physicians who are now emerging from medical schools and residency training programs. During the 1960s, it appears that demand for physicians' services--stimulated by growing third party payment for services--was rising more rapidly than was the supply of physicians. Consequently, young physicians in most specialties could choose a practice location on the basis of factors other than competitive environment. While income potential was a consideration, there were a wide range of locations and practice alternatives which could be reasonably expected to yield an "acceptable" or "target" income level. Thus, competitive factors were weighted less heavily in the decision process.

The supply of physicians has increased dramatically during the past decade and is expected to grow by an additional 35 to 40 percent by 1990. As a result, competitive pressures on young physicians may be expected to affect their location decisions and shifts in these patterns may occur. Early evidence that this is occurring is presented for the 1970-79 period by Newhouse et al. (1982). They find that, as the supply of physicians grew during the 1970s, physicians diffused into smaller communities. In their 23 state sample, by 1979, nearly every community with 2500 or more population had access to physicians. The diffusion effect was, in general, stronger for more generalized physicians, who could be regarded as being "pushed" out of more desirable areas by the competitive pressure generated by specialists who can provide specialized services, in addition to primary care. Newhouse et al. conclude:

> The data strongly suggest that competitive forces play a major role in determining where physicians choose to practice. As the pool of physicians expands during the 1980s, a wide range of services will become increasingly available to populations outside metropolitan areas.

A related study by Schwartz et al. (1980) examines the diffusion of board-certified physicians into smaller communities as the supply of board-certified physicians increases. Both the Newhouse et al. and Schwartz et al. studies are of limited usefulness for the current study, however, since both limit their examination to more populous rural areas. Newhouse et al. investigated the supply of physicians in towns of 2,500 or more population; Schwartz et al. (1980) looked at rural towns of between 10,000 and 20,000 population. Rural areas of this size have had relatively little difficulty attracting physicians in the past. The rural communities most likely to experience shortages are those which have <u>not</u> been included in these studies.

Another recent study by Langwell et al. (1983) provides supporting evidence for these observations. The changing location patterns by county of ophthalmologists and optometrists were examined for the 1972-1979 period to determine whether there was movement toward rural practice and whether competitive pressures could be observed in these patterns and, if so, the strength of this factor. Ophthalmologists (M.D.s) and optometrists (O.D.s) provide services which substantially overlap and, therefore, compete for patients over this range of similar services. In addition, both professions have substantially increased in numbers during the 1970s and there is evidence that an oversupply in some areas may have already existed in the 1970s. Findings reported by Langwell et al. indicate that the relationship between changes in the supply of ophthalmologists and the supply of optometrists were uniformly negative over this period, suggesting that competing professionals during the 1970s were affected by the degree of competition expected in location alternatives considered. The descriptive findings of this study also support the diffusion hypothesis with optometrists diffusing to more rural areas and ophthalmologists increasing their concentration in urban and less rural areas.

Although the evidence available is not extensive, it suggests that the changing competitive environment within which new physicians are choosing practice locations will have substantial effects on those decisions. Consequently, the relative importance of the factors which were identified as influential during the 1950s and 1960s may change.

5. Location Decisions for Shortage Areas and Decisions of NHSC Alumni

A rather smaller body of literature is available which addresses decisions which result in location in shortage areas and/or the location decsions of NHSC alumni. This subsection examines this limited research.

The most recent examination of the factors which influence the decision to choose a shortage area location rather than a nonshortage area is by Werner, Wendling, and Budde (1979). The authors' design is predicated on the assumption that the shortage-nonshortage location choice is clearly different from the urban-rural choice which has been studied most frequently. Using the 1965 U.S.M.G. Rand-AMA survey data, a location choice model is specified to explain the shortage-nonshortage choice and the urban-rural choice and is estimated using probit analysis. Results strongly support the authors' hypothesis. Rural choices were influenced by:

- Preceptorships
- Loan forgiveness
- Community recruitment efforts
- Specialty
- Rural rearing
- Prior contact
- High medical need of area
- Concern over CME opportunities
- Cultural advantages

By contrast, a much shorter list of factors influences the shortage area location decision:

- Specialty
- Rural rearing
- Concern over CME opportunities
- High medical need of area

Interestingly, programs designed to induce physicians into shortage area practices (i.e. preceptorships, loan forgiveness) are significant in the rural location decision but are nonsignificant in the the shortage area location decision.

Madison and Combs (1981) examine the location patterns of young physicians who settled in rural communities between 1973 and 1976. They report that young physicians settling in rural areas are most likely to locate in towns where there is already a medical community. They note that young physicians avoid areas which have only 0 to 3 other physicians; indeed, over two-thirds settled in towns which already had 4 or more physicians. When Madision and Combs look at the characteristics of NHSC communities, they find that few non-NHSC settlers locate in communities similar to these areas which have small population and lack a medical community.

HRRC (1975) provides a critical review of the evidence on the effectiveness of policies to influence physicians to locate in shortage areas. These policies include: (1) preferential admission to medical school for those students most likely to practice in medically underserved areas; (2) preceptorships; (3) loan forgiveness tied to service obligations; (4) decentralization and/or deurbanization of medical education; (5) the Hill-Burton Hospital Construction Act; and (6) recruitment efforts of communities. The evaluation of the effectiveness of loan forgiveness tied to service obligation programs is of particular interest for this effort[1]. Review of the findings of a number of pre-1975 studies (Consad, 1973; Michigan Medical Manpower Study, 1974) yields the following conclusions:

- Between 40 percent and 60 percent of loan recipients under state programs established practices in shortage areas in order to obtain forgiveness. Of these, "most" remained in practice in the shortage area after completion of this obligation.

- There was some evidence in the mid-1970s that a shift in demand from state loans (with mandatory forgiveness features and penalties) to HPEAA loans (with optional forgiveness and no penalties) was occurring.

- It is possible that physicians who achieved loan forgiveness under this program received windfall gains (i.e. they would have established practice in a shortage area without the program).

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[1]At the time the HRRC review was underway, there were a number of state programs which offered loans to medical students which could be repaid (in most cases) or forgiven by establishing a private practice in a state-designated shortage area. These programs are comparable to the current Private Practice Option in the NHSC program. The federal program under the Health Professions Education Assistance Act had not been in existence for a sufficient period for its effectiveness in inducing physicians to settle in scarcity areas to be evaluated.

Overall, the review of the evidence suggests that the early PPO-type programs operated by states were quite effective in placing physicians in scarcity areas; less in known about retention rates over a longer period of time.

Other policies reviewed by HRRC indicate that individuals who locate in scarcity areas may have specific characteristics and experiences:

- Preferential admission to medical schools for individuals from medically underserved areas appears to be an effective mechanism (Mattson et al., 1974), providing support for the prior contact hypothesis.

- Medical students from urban areas who participate in a perceptorship in rural areas are more likely to locate in a rural community (Steinwald and Steinwald, 1973); but no information on shortage area practice location decisions is available.

- Efforts made by underserved communities to attract new physicians can be quite successful, especially those which include economic incentives such as an office and equipment and guaranteed income level. The evidence on these programs, however, is nearly all anecdotal — "success" stories.

The HRRC review concludes that the evidence on the effectiveness of policies designed to induce physicians to locate in scarcity areas is weak. This conclusion is consistent with the Werner et al. findings which suggest that these policies may induce physicians to practice in rural areas, but have no effect on the decision to locate in shortage areas.

GAO (1974) provides further evidence that decisions to locate in shortage areas are not influenced by programs designed to affect these decisions. A survey of the 183 (of 30,000 loan recipients) physicians and dentists who located in shortage areas to obtain forgiveness of loans was conducted; 82 percent of respondents stated that they would have located in the shortage area without the loan forgiveness inducement. These physicians indicated that the most important factors influencing their decision to locate in a shortage area were (by rank):

1. Geographic preference
2. Desire to serve where most needed
3. Opportunity for experience
4. Influence of family or friends

5. Association with colleague

6. Availability of facilities

7. Loan cancellation

8. Financial attractiveness

Of the scholarship recipients who were repaying loans, the GAO survey asked that factors considered unattractive about rural shortage area practice be ranked. The respondents ranked these undesirable conditions in the following order:

1. Lack of CME opportunities

2. Long hours of practice

3. Distance to support facilities

4. Lack of consultative sources

5. Limited cultural and social activities

6. Preference for a large community

7. Necessity of engaging in general practice

8. Lack of desirable living conditions

9. Financially unattractive

It is interesting to note that financial attractiveness or unattractiveness of the area was not of great importance in the scarcity area decision for either group. GAO concludes that the HPSAP program was not effective in inducing physicians to locate in shortage areas; a finding clearly consistent with the respondents' self-reported lack of emphasis on financial incentives.

A subsequent GAO (1978) study of the effectiveness of the NHSC program in inducing physicians to permanently locate in shortage areas produced similar conclusions — only 42 of 800 NHSC alumni had been retained in shortage areas as private practitioners by July 1976. Those NHSC alumni who were not planning on shortage area practice indicated that a desire for further education and training was the major reason for leaving shortage area practice. Other reasons for leaving included professional and social isolation, and personal, family, and financial needs.

Family Health Care, Inc. (FHC) (1977) reports on a study of retention and attitudes of NHSC physicians and spouses in first tours of duty and found that 38 percent intended to remain in the shortage areas for at least one year after completion of their obligation. Those intending to remain were most influenced by their spouses' opinions of the area, and by the high demand for services in the area observed during the NHSC service. On the other hand, those not planning to remain frequently reported that low demand for services in the area was a factor in their decision. This finding suggests that shortage areas with unmet demand may be successful in retaining NHSC alumni; areas with relatively few physicians but with low effective demand for additional services will be perceived (appropriately) to be unable to support another private practice.

A recent study (Stamps and Kuriger, 1983) reports on a survey of 100 NHSC physicians in 10 East Coast states which was conducted to obtain information on their locational plans after completion of the NHSC obligation and on the factors influenceing their decisions. Results indicate that 56 planned to locate in a rural area after completion of NHSC service. Those preferring rural practice were more likely to be in primary care specialties and more likely to rank personal and community factors more highly than professional factors as influences on the decision process. Physicians originally from rural areas were more inclined to rural practice (76 percent versus 47 percent from urban areas).

In summary, evidence available on shortage area location decision processes suggests that factors influencing this decision are different than factors influencing rural location decisions. Policies designed to influence the decision to locate in shortage areas may be effective in inducing physicians into rural practice, but appear to be an ineffective mechanism for eliciting shortage area practice decisions. There is some evidence that many -- or most -- NHSC alumni who locate in shortage areas did so because they had a prior preference for the area and were not influenced by the program. In addition, there is some limited evidence that not all shortage areas are identical -- some may have relatively few physicians, but NHSC alumni are uninterested in locating permanently in areas which have insufficient demand to support a new practice. Other areas have both a need for and the ability to support additional practices; these communities may be expected to be more successful both in attracting non-NHSC physicians, and in retaining NHSC alumni.

6. Discussion

This review of the evidence on location decisions of physicians and the factors which influence them provided a framework for the development of hypotheses and research questions for the comparative evaluation of NHSC alumni retained in Health Manpower Shortage Areas. The findings of this literature review suggested the following major issues for the design of the evaluation:

- The rural-urban location decision is a distinctly different one than the shortage-nonshortage area choice.

- The physician choosing a rural and/or shortage location may have made this decision prior to involvement in NHSC. It will be important to compare the timing of the location decision for the NHSC and nonNHSC physicians and characteristics of these physicians to determine whether the physician participated in NHSC because of a prior decision/tendency or whether the decision was influenced by the NHSC program. If prior contact factors or other characteristics of the physician fully explain shortage area choices, this should be determined.

- Shortage area communities have different degrees of unmet demand. It is highly unlikely that physicians will locate in areas with need, but low effective demand. On the other hand, NHSC may be very effective as a means to acquaint physicians interested in rural practice with areas with high unmet demand and opportunities for rapid establishment of a new practice. An objective of this study was to identify characteristics of communities with high unmet demand and communities with need but low demand in order to (1) facilitate retention by placing NHSC physicians in sites with can absorb the services of an additional private practice physician; and/or (2) to identify the characteristics of communities which need physicians' services but are highly unlikely to attract a permanent physician in order to permit the NHSC to develop priorities for placement of personnel.

- The competitive environment facing new physicians establishing a practice is considerably different than that facing new market entrants prior to the mid 1970s when much of the earlier research on physician location decisions was conducted. Consequently, it was important to focus attention in this study on the effect of market forces and competitive factors on the location decisions of new entrants to the market.

These issues and the specific factors identified as influential on physician's location decisions provided the foundation upon which we have developed the hypotheses and research issues described in Section B.

B. HYPOTHESES AND RESEARCH ISSUES

1. Overview

The analyses to be conducted during this study focus on three specific areas:

(1) the rural-urban location decision of 1979 NHSC physicians surveyed by MPR;

(2) the rural shortage-nonshortage area location decisions of all rural NHSC and non-NHSC physicians graduating from medical school between 1974 and 1978; and

(3) the practice characteristics of NHSC and non-NHSC physicians located in rural areas.

The discussion of the literature presented above suggested that there are specific factors which influence the rural location choices of physicians; the decision to locate in a rural shortage area is a subset of the rural decision but is influenced by a somewhat different set of factors. It is likely that the impact of certain factors on the location choices of NHSC alumni and other young physicians will vary in magnitude and significance. Based upon the literature review and the evidence presented there, it is evident that the rural location choice must be considered separately from shortage area location choice. Within each of these decision categories, the individual characteristics of the physician and the characteristics of communities and markets are expected to influence the decision process.

In this section, a set of hypotheses are presented for the analytic areas of interest:

- o rural choices
- o shortage area choices
- o practice characteristics choices

Each major issue area below is briefly described with respect to the objectives and potential unsefulness of findings to HRSA.

2. Rural Choices

The primary objective of the NHSC program is to provide service to areas with insufficient physician resources either temporarily, through placements, or permanently, through retention of placed physicians. Thus, the focus of this evaluation is on the characteristics of physicians and

communities which result in decisions to locate physicians' practice in shortage areas. The decision to locate in a rural health manpower shortage area, however, is a subset of the rural location choice; i.e. the physician interested in rural shortage area practice will be interested in rural practice, generally. To examine the relationships among personal characteristics, community characteristics, and shortage area location choice, it is necessary to explore those factors which influence young physicians to locate in rural areas.

There are six major areas which distinguish rural-urban choices of young physicians:

Timing of the location decision:

If some physicians make permanent location decisions early in their training , subsequent actions by the NHSC designed to influence these location decision will be ineffective. Examination of the timing of decisions by physicians with different characteristics will permit HRSA to identify physicians who may be least likely to be induced to remain in shortage area practice.

Prior contact factors:

It is generally agreed that prior contact is an important factor in location choice. Information on the influence of prior contact on the rural and the shortage area choice, and the degree of this influence on these two separate decisions, will be of use to the Corps in recruitment and placement policy decisions.

Spousal or family influence:

Characteristics of the spouse, and family background, are expected to influence the physicians' location choice. Again, the degree of this influence on physicians with a particular set of characteristics may be useful information for placement decisions, depending upon the objectives of Corp's placements.

Personal characteristics:

Physicians with certain personal characteristics may be more or less likely to be retained in shortage areas. Identification of these factors, and the combinations of these factors, will allow assignment of those most likely to be retained to areas most in need of permanent physician resources.

Professional factors:

The physicians' training and professional orientation is expected to strongly influence location preferences. The strength of this influence and the particular professional factors which are most important to young physicians will determine which rural and shortage areas are able to attract and retain young physicians. Information on this issue will enable the Corps to identify communities which are more or less likely to attract permanent physician resources.

Community characteristics:

Among rural and shortage area communities there are wide variations in characteristics which cause the community to be more, or less, attractive to young physicians. As the supply of physicians increases and diffusion into less populous areas occurs, those rural and shortage area communities with specific types of characteristics will attract new physicians. Other less attractive communities, however, will continue to experience a shortage of physician services. It is particularly important that the NHSC program have information which will permit it to identify the characteristics of communities which are expected to have long term need for medical services. With this information, the Corps can develop and implement placement policy to meet particular objectives with respect to both access to services and retention of alumni.

The research which examines the rural-urban location choices is conducted using only the 1979 sample of NHSC physicians surveyed for the earlier NHSC evaluation study. Thus, these hypotheses are stated for NHSC physicians only. Hypotheses which distinguish among the characteristics of rural communities, on the other hand, will be examined using the entire sample of NHSC and non-NHSC physicians.

Timing of Decisions

- NHSC physicians in urban and rural locations will not differ in the reported timing of their location decisions.

Prior Contact Factors

- NHSC physicians with rural rearing will be more likely to choose rural locations.

- NHSC physicians with prior professional exposure to rural practice (i.e. through the NHSC service, residencies, preceptorship programs, or other mechanisms) will be more likely to choose rural practice.

Spouse's Background/Family

- NHSC physicians who are married will be more likely to choose rural practice if their spouse is from a rural area or has a preference for rural life style.

- NHSC physicians who are married will be more likely to choose rural practice if their spouse is not concerned about career opportunities.

- Physicians with family ties to a specific area will be more likely to locate in that area.

Personal Characteristics

- Male NHSC physicians will be more likely to locate in rural areas than female NHSC physicians.

- NHSC physicians who are older than average at the time of an initial location decision will be more likely to locate in rural areas.

- U.S. medical graduates will be more likely to locate in more populous rural areas than foreign medical graduates; FMGs will be more likely to locate in least populated rural areas.

Professional Factors

- NHSC physicians who are less concerned about continuing medical education opportunities will be more likely to locate in rural areas.

- NHSC physicians who are able to join a group or partnership practice will be more likely to choose a rural location.

Community Characteristics

- Physicians will be more likely to choose a rural practice in a community that offers good quality educational resources.

- Physicians will be more likely to locate in rural communities which have adequate professional personnel and facilities.

- o Physicians will be more likely to locate in rural communities that have sufficient unmet effective demand to ensure that an additional practice can be supported (i.e. that income potential is present).

- o Physicians will be more likely to locate in rural communities which have relatively high per capita income levels.

- o Physicians will be more likely to locate in a rural community with offers recreational, cultural, and/or geographic features that are generally attractive.

3. Shortage Area Choices

It has been assumed for this study that the physicians who choose a rural shortage area practice will have made a prior commitment to rural practice. Therefore, the hypotheses related to rural location choices apply to the physician choosing a shortage area practice. This aspect of the study is of greatest interest and potential usefulness to Corps policy makers since the Corps' primary objectives are to provide services to communities with a shortage of physicians resources and to place physicians in HMSAs where they will decide to remain after completing their obligation. The diffusion of physicians to rural areas doesn't ensure the shortage areas will receive new physician resources. However, as the supply of physicians in the most attractive rural areas increases, competitive pressures may force new physicians into areas which are less attractive and which have been in shortage for some period. Some communities, however, may never attract a permanent physician even when substantial medical need exists; there may be insufficient effective demand to support a physician's practice, professional resources available may be inadequate to provide a foundation for a practice, or the community characteristics may be so uninviting that no one chooses to live there. Recognizing these problems, it remains important to identify factors that may influence young physicians to choose shortage area practice and/or to remain in an NHSC site after completion of an obligated service. Based upon prior literature, these factors are more often personal and professional than community characteristics. In addition, it is anticipated that the NHSC experience may be of importance in this decision. The hypotheses listed here focus on those research issues which are expected to distinguish the shortage area location decision from the rural location decision.

NHSC

- o Physicians who are NHSC alumni will be more likely to choose a shortage area location as a result of contact with the area.

Professional Factors

- Physicians who are least concerned about CME opportunities and collegial interaction will locate in a rural shortage area.

- Physicians who are primary care specialists (i.e. internists and pediatricians) will be less likely to locate in a shortage area than in a rural area.

Prior Contact Factors

- Physicians who were reared in a shortage area (or whose spouse was) are more likely to choose shortage area practice.

4. Practice Charactistics

National Health Service Corps physicians, both volunteers and scholarships recipients, gain experience with the NHSC practice style during their service. Particular elements of this practice type may include the use of auxiliary personnel in practice, working with patients from lower socioeconomic backgrounds, use of a fee structure which is adjusted to the patient's ability to pay (Mathematica Policy Research, 1982). NHSC alumni may carry these experiences into their subsequent practices, regardless of whether they locate in a shortage or non-shortage area. If so, then they may fill unmet need even in overall non-shortage areas which still have gaps in physician services availability.

NHSC

- NHSC alumni will be more likely to have a practice style similar to the style present in Corps sites than are non-alumni.

Auxiliary Use

- NHSC alumni will be more likely to use auxiliary personnel (e.g., PA, NP) in their practice than are non-alumni.

Patient Characteristics

- The NHSC alumni will have a patient population that is poorer, has lower socioeconomic status, or has other characteristics which are frequently associated with reduced access to or utilization of health services.

Fee Structures

- NHSC alumni will provide proportionately more free care than non-alumni.
- NHSC alumni will be more likely to accept assignment for Medicare claims.
- NHSC alumni will have a higher proportion of Medicaid patients in their practice than non-alumni.
- NHSC alumni will be more likely to have a sliding scale fee structure tied to patient income.

III. ANALYSIS OF INDIVIDUAL PHYSICIANS' LOCATION DECISIONS

A. OBJECTIVES

In Chapter II, prior research on physicians' location choices was reviewed and hypotheses about factors which are expected to influence young physicians location choices were presented. In this chapter, we summarize the data sources, methodology used to examine factors influencing young physicians' choices of practice location between rural and urban alternatives, between HMSA and non-HMSA alternatives, and between remaining in an NHSC site and re-locating, and describe the findings of these analyses.

The objectives of these analyses include:

- to understand the relationship of personal and professional characteristics and experience and the location choices of individual physicians
- to examine the individual physicians' stated preferences for location choices and the relationship of these preferences to actual choices
- to determine whether there are differences among groups of physicians in the factors which influence location decisions.

To address these objectives, several interrelated analyses were conducted. Briefly, the analyses reported in this chapter include:

- descriptive profiles of professional and personal characteristics of young physicians, by type of physician and by location patterns
- examination of factors stated as influencing location choices of young physicians, including confirmatory factor analysis
- analysis of prior contacts and the influence of prior contact events on location patterns
- Multivariate analyses of individual physicians' location choices
  - -- rural versus urban choices, for NHSC alumni who were included in both the 1979 MPR Survey and in the 1984 survey

-- HMSA versus non-HMSA choices, for all respondent physicians who graduated between 1974 and 1978 and who are currently in primary care practice in a rural area and, separately, for NHSC alumni and non-alumni and for M.D.s and D.O.s.

-- retention versus re-location choices, for all NHSC alumni

B. DATA SOURCES

The primary source of data for the analyses of individual physicians' location choices is the 1984 Survey of Young Physicians, conducted by Mathematica Policy Research between September 1984 and January 1985. Copies of the survey instruments are included as Appendix A to this report. The purpose of this survey was to collect several types of data:

- o personal and professional characteristics of young physicians
- o young physicians' own perceptions of the factors which were important to them in choosing a practice location
- o NHSC alumni perceptions of their satisfaction with NHSC service
- o practice characteristics of young physicians

Several categories of young physicians were included in the survey:

Category 1: M.D.s who graduated between 1974 and 1978, who are in primary care practice in non-metropolitan areas, and who had no NHSC service (AMA).

Category 2: D.O.s who graduated between 1974 and 1978, who are in primary care practice in non-metropolitan areas, and who had no NHSC service (AOA).

Category 3: Physicians in PPO service to fulfill an NHSC service obligation (PPOs).

Category 4: NHSC alumni who graduated from medical school between 1974 and 1978 and who are in primary care practice in a non-metropolitan area, excluding those alumni who were respondents to the 1979 MPR survey (NHSC alumni).

Category 5: NHSC alumni who were respondents to the 1979 MPR Survey of NHSC physicians (NHSC 1979 alumni).

Names and addresses for the universe of physicians in Categories 1 and 2 were provided by the American Medical Association and by the American Osteopathic Association. PPOs and NHSC alumni names and addresses were provided by the National Health Service Corps. The sample of young physicians surveyed was a very large proportion of the universe from each category.

Category	Universe	Sample	Percent of Universe
AMA	2747	1,932	70%
AOA	401	401	100%
PPO	453	329	73%
NHSC Alumni	425	425	100%
NHSC 1979	367	367	100%
Total	4,393	3,454	79%

A combination mail and telephone survey methodology was used for this project. There were two versions of the survey questionnaire; one was designed for current members of the NHSC under the Private Practice Option contract. This version included all questions addressed to the non-NHSC populations and alumni samples excluding questions which were inappropriate to ask given their PPO contract with NHSC. For example, the PPO version did not ask the physicians if they accepted Medicaid patients, as their agreement with NHSC stipulates that patients will not be refused on the basis of their Medicaid status. The PPO version of the questionnaire contained 55 questions; the non-NHSC and alumni version had 64 questions.

The initial mailing of the survey was posted the first week of October 1984. Included in the packet was an introductory letter signed by Dr. Kenneth Moritsugu, Director of the National Health Service Corps. The letter stated the purpose of the survey and requested each physician's participation. The appropriate questionnaire for the sample was enclosed along with a postage-paid business reply envelope in which to return the survey. A follow-up mailing was made the last week of October to physicians who had not yet responded to the initial survey. The follow-up survey was

accompanied by a letter from Kathryn Langwell, MPR Project Director, and requested the support of the physicians. The second mailing went to approximately 2,300 physicians of the original sample.

Mail survey returns included a total of 1,169 completed questionnaires. These completed questionnaires were from physicians who were currently practicing in the private sector, who provided direct patient care, and were not currently in a residency or fellowship program. In addition, twenty-eight duplicate names were eliminated from the sample during the follow-up. These doctors' names had appeared on more than one sample list. There were 176 address correction forms received by MPR in response to the "Address Correction Requested" instruction on the mailing envelope.

The telephone follow-up to nonrespondent physicians was made to the NHSC alumni physicians in Categories 4 and 5. The telephone survey began the first week of December and continued through the first week of January. A total of 214 interviews were completed by telephone. The questionnaire content was identical to the mail survey sent to non-NHSC physicians and alumni; very slight modifications in wording were made to facilitate telephone interviewing.

The total sample size of the survey was 3,454 physicians. In the AMA, AOA, and PPO samples there were 1,658 nonrespondents; that is neither of the mail surveys was returned. As these samples were not followed up by telephone, these could not be converted into other final status categories. Another 320 designated respondents were found to be ineligible or unlocatible; 113 physicians refused to participate.

The total number of telephone and mail completions was 1,383:

	Original Sample	Non-Respondents	Ineligible	Refusals	Completion
AMA	1,932	1,187	32	18	695
AOA	401	269	10	5	117
PPO	329	161	9	3	156
NHSC Alumni	425	14	158	48	205
NHSC 1979	367	7	111	39	210
Total	3,454	1,628	320	113	1,383

The adjusted sample size after elimination of ineligibles and those physicians who could not be located was 3,134. The completion rate based on the adjusted sample size was 44% over all samples and includes both telephone and mail responses.

	Original Sample	Adjusted Sample	Total Completions	Mail Completions	Telephone Completions	Completion Rate*
AMA	1,932	1,900	695	695	0	37%
AOA	401	391	117	117	0	30%
PPO	329	320	156	156	0	49%
NHSC Alumni	425	267	205	77	128	77%
NHSC 1979	367	256	210	124	86	82%
Total	3,454	3,134	1,383	1,169	214	44%

*Completion rate based on total completions in adjusted sample size.

The largest group of ineligibles were those physicians who had not made a choice in establishing their practices; physicians in the military, in a residency or fellowship program, or who are serving in the Indian Health Service were classified as ineligible. Other ineligibles included those who were retired or not presently practicing, and those with a specialty such as psychiatry or radiology, who were not in primary care practice. Finally, doctors with invalid addresses and for whom there were no forwarding addresses were eliminated from the sample, if initial telephone contacts suggested that tracing these physicians would be very difficult. The table below summarizes the ineligible group, by category and reason for ineligibility:

	Category					
Reason for Ineligibility	AMA	AOA	PPO	NHSC Alum	NHSC 1979	Total
Deceased	1	0	0	1	2	4
Duplicate	2	0	6	18	2	28
Invalid Address	11	5	1	69	58	144
Ineligible - N.E.C.	0	5	0	1	1	7
Military	9	0	0	7	4	20
Inappropriate Specialty	0	0	0	4	0	4
Retired/Not in Practice	5	0	1	3	3	12
Moved to Urban Area	0	0	0	11	0	12
Indian Health Service	3	0	0	3	0	6
Residency/Fellowship	1	0	1	41	40	83
Total	32	10	9	158	110	320

The other major data sources for these analyses were the Area Resource File and the City and County Data Book for descriptive variables

for counties in which NHSC obligations were served and to categorize current locations. In addition, NHSC data sets and MPR 1979 survey data sets were used to identify NHSC sites in which each NHSC alumni served.

C. DESCRIPTIVE ANALYSES: METHODOLOGY AND FINDINGS

1. Personal and Professional Characteristics of Physicians and Location Patterns

The examination of the personal and professional characteristics of physicians and their location choice patterns is intended to provide indications of the differences among the categories of physicians of interest.

a. Methodology

The examination of the survey data focused initially on the personal and professional characteristics of physicians who have located in rural and HMSA areas. It is particularly interesting to compare these characteristics across the several physician groups:

- NHSC alumni
- Current PPOs
- Non-NHSC physicians
  - -- MDs
  - -- DOs
- NHSC 1979 Alumni
  - -- urban locations
  - -- rural locations

The personal characteristics of interest include:

- age
- prior contact
  - -- rural birthplace
  - -- rural rearing
  - -- spouse rural rearing
  - -- rural college
  - -- rural medical school
  - -- rural residency
- sex

- o citizenship
- o race/ethnic group
- o marital status
  - -- spouse education
  - -- spouse employment status

Professional characteristics of interest include:

- o specialty
- o board certification status

The examination of these data were conducted in two phases:

(1) comparison of means across the physician categories of interest

(2) comparison of means by non-HMSA and HMSA location decisions and by physician categories.

Arraying the data in this fashion permitted the identification of differences in personal and professional characteristics of physicians in the sample by type of physician and by type of location choice.

b. Findings: Personal and Professional Characteristics of Physicians and Location Patterns

The personal and professional characteristics of physicians by type of physician respondent and by location in HMSA and non-HMSA areas were examined to determine whether there were certain characteristics which appear to be associated with HMSA and nonHMSA location choices. In Table A.1, the mean values of personal and professional characteristics for respondents are shown, by category of physician. Comparing these means reveals that there are some differences among categories of physicians:

- o NHSC alumni and PPOs report substantially fewer prior contacts with rural areas than do non-alumni; osteopathic physicians report the highest number of prior contact events.
- o Alumni are more likely to be female than non-alumni; osteopathic physicians are much less likely to be female.

- Alumni, PPOs and osteopathic physicians are overwhelmingly U.S. natives.

- While a high proportion (14%) of alumni are non-white; only 4.67% of PPOs are non-white and only 1.43% of non-alumni are nonwhite.

- Non-alumni are more likely to be married than are alumni; PPOs are least likely to be married.

- Differences by specialty are substantial

  -- the combined general/family practice specialties account for between 66 percent and 87 percent of all physicians in the study, by group.

  -- 20 percent of non-alumni and 15 percent of alumni are internists; both groups have between 8 and 9 percent pediatricians.

- Non-alumni are overwhelmingly (91%) board certified or board eligible compared with 72 percent of alumni, and 63 percent of PPOs; only 57 percent of D.O.s are board-certified or board eligible.

There are a number of differences in personal and professional characteristics of alumni and non-alumni--specifically, NHSC alumni:

- have <u>fewer prior contacts</u> with rural areas

- are more likely to be <u>non-white</u>

- are less likely to be <u>married</u>

- are <u>general practice physicians</u> more often

- are less likely to be <u>board certified</u> or board eligible.

Alumni who were serving at an NHSC site in 1979 were included in this study whether they were currently practicing in an urban or rural area. Comparison of their personal and professional characterisics (Table A.1) reveals several differences by location:

- 1979 alumni currently practicing in rural areas reported more prior contacts with rural areas than did urban 1979 alumni; however, they tend to have had fewer prior contacts than all alumni and fewer than non-alumni in this sample.

- Rural 1979 alumni were more likely to be female and non-white than were other groups. However, a slightly higher proportion of non-whites were in urban areas.

- Urban 1979 alumni were less likely to be general and family practitioners and much more likely to be in non-primary care specialties (21% versus 2%).

- Urban 1979 alumni were more frequently board certified or board eligible than were rural NHSC alumni; the percentage board certified/eligible of urban 1979 alumni was approximately the same as for non-NHSC physicians (85% versus 66%).

Evidently NHSC alumni who choose urban practice locations are those who have less prior exposure to rural areas and who more frequently choose to enter non-primary care practices.

When these characteristics are compared for NHSC alumni and non-alumni, by location of practice in whole county and part-HMSAs and non-HMSA counties (Tables A.2 and A.3), a distinct pattern emerges:

- NHSC alumni who locate in non-HMSAs tend to be more similar to non-alumni, in general, than to NHSC alumni in whole county HMSAs; specifically, they have more prior contact events, are more likely to be male, are more often foreign born, are less often non-white, less likely to be in GP/FP practice, and somewhat more likely to be board certified and board eligible. Alumni in part HMSAs are least likely to have had prior contact with rural areas.

- When non-alumni and alumni characteristics are examined by HMSA status, several differences are evident

  -- alumni and non-alumni who locate in whole HMSAs and non-HMSAs report considerably more frequently that they had early prior contacts with rural areas; those who located in part-HMSAs, however, were somewhat more likely to have had a rural residency

  -- alumni and non-alumni who located in non-HMSAs or part-HMSAs were more frequently in internal medicine or another specialty than general or family practice

- non-alumni in non-HMSAs or part-HMSas and alumni in part-HMSAs were more likely to be board certified than were non-alumni in while county HMSAs

Overall, it appears that the personal and professional characteristics of physicians who locate in non-HMSAs and in part-HMSAs are similar. Those who locate in whole county HMSAs, however, are less specialized and less often board certified/eligible.

While examination of professional and personal characteristics by type of physician and location of practice reveals that there remain substantial differences between alumni and non-alumni characteristics, the fact that there is some convergence of characteristics within locations suggests that there is a relationship between these characteristics and the choice of a whole HMSA, part HMSA, or non-HMSA location.

2. Ranking Factors Reported as Influencing Location Choices

The 1984 Survey of Young Physicians asked respondents to indicate whether selected factors were important to their location decision and to rank the three factors which were "most important." The location decision is viewed as occurring in two phases. First, the physician decides that he/she wants to locate in an area which has certain characteristics. Then, among communities which have some or all of these general characteristics, the physician chooses to locate in a specific community which fulfills the general requirements and, perhaps, meets additional criteria. It should be recognized that the location criteria, in general and specifically, may change or shift in importance between the time the search begins and the time when a location choice is made. As the physician obtains more information on the locations available and observes practitioners in different areas, there may be substantial changes in preferences. Since the survey was conducted after the location choice has been made, we expected that the respondent will indicate the final set of general and specific factors which influenced the location decision. It is also the case that, if the physician is dissatisfied with the location, there may be differences between the stated preference and the characteristics of the location.

a. Methodology

Examination of data. The analysis of the data collected on factors which physicians stated were important influences on their location decisions involved several ways of examining the data:

- First, the frequency with which respondents in different groups and location categories indicate a factor as influential were examined.
- Second, a numerical score was attached to each factor ranked as first, second, or third most influential, and "scores" were examined for respondents in physician groups and location categories. This was done separately for the "general" and for the "specific" location choice factors. In addition, the correlations of the "general" and "specific" factors were calculated.

- Third, correlation analysis was done to identify factors which seem to be strongly related (i.e. either positively or negatively). The correlation matrix was constructed separately for responses for the general location choice and for the specific location choice. It was also constructed to permit examination of the correlation of responses to the general and the specific choice factors. This phase of the analysis permitted the investigation of the consistency of responses.

The examination of these data was intended to be exploratory. Results provided direction to the data reduction and confirmatory factor analysis.

Data reduction and confirmatory factor analysis. The 26 locational factors are representative of a smaller set of more general locational considerations. For example, "income potential" and "prosperity of community" both relate to earnings opportunities. By grouping the 26 factors into a smaller number of general types of locational considerations, we make it easier to search for patterns among the locational considerations of physicians and to investigate differences among classes of physicians (e.g. physicians locating in HMSAs versus others).

To assist us in grouping the 26 preferences into a smaller number, and in performing some related analysis, we used a procedure known as confirmatory factor analysis. Confirmatory factor analysis is a formal statistical procedure for determing how well a particular a priori grouping of factors fits the data. Each individual item (in our case, each of the 26 preferences) is viewed as one of multiple indicators of an underlying, unmeasured general factor, of which there may be several. Formally, this is expressed as follows:

$$I_{ij} = \lambda_{jk} F_{ik} + d_{ij}$$

where I_{ij} is the observed value of item j for the ith observation, F_{ik} is the unobserved value of the kth general factor, λ_{jk} is a standardized coefficient utility factor F_k to item I_j, and d_{ij} is a residual with a mean of zero and a standard deviation equal to δ_j.

Unlike principal components factor analysis, wherein the general factors are assumed to be uncorrelated with each other, the latent factors of confirmatory factor analysis are allowed to be correlated. The estimation of these correlations is one objective of the analysis. A more important objective, generally, is the estimation of the impact of these latent factors upon various dependent variables. In the present application our ultimate goal is to better understand how location preferences affect the location choices of rural physicians.

As is true of factor analysis generally, the input data from which the confirmatory factor model is estimated are the observed correlations (covariances are used if an unstandardized solution is desired) among the items, I_i. The model is evaluated according to how well the correlations implied by the model match these same observed correlations. To understand the source of these implied correlations, consider Figure III.1, which illustrates a factor model for two general factors, F_1 and F_2, and their indicators, I_1 through I_7. Items I_1 to I_3 are indicators of F_1 while items I_4 through I_7 are indicators of F_2. The model assumes that items which are indicators of the same general factor are correlated by virtue of their common cause (the general factor). In the figure the implied correlation between indicators I_1 and I_2 is given by the product of the coefficients λ_{11} and λ_{21}. For items representing different general factors the model assumes that their observed correlation is a function of the unobserved correlation between the general factors as well as the relationship between each item and the factor it indicates. In the figure the implied correlation between I_1 and I_4, indicators of different general factors, is given by the product of the correlation γ_{12} and the coefficients λ_{11} and λ_{42}.

The goodness of fit of a particular factor model may be assessed by computing a chi-square statistic that compares the inter-item correlations predicted by the model with the correlations actually observed in the data. Under the right conditions this statistic is a likelihood ratio test statistic for the null hypothesis that the predicted and observed matrices of correlations are identical. In practice, its use in this manner is rarely justified and too often results in the rejection of models. Instead the chi-square statistic is recommended as a goodness of fit measure for comparative model fitting, rather than a test statistic per se (Joreskog and Sorbom, 1981). If the difference in chi-square between two models is greater than the difference in degrees of freedom, the model with the smaller chi-square may be considered as providing a better fit.[1] The researcher can continue to test new models to improve the fit, but after a point further improvements amount to overfitting--that is, fitting the unique properties of a given sample, with the resultant loss of generality. Depending on the sample size, a model may be considered to provide an acceptable fit if the ratio of chi-square to its degrees of freedom is between 2:1 and 10:1, although the goal is certainly closer to the low end of that range.

To supplement the chi-square statistic, Joreskog and Sorbom (1981) have proposed a goodness of fit index and an adjusted (for degrees of freedom) index with ranges of 0 to 1. These may be used to compare models across data sets as well as within the same data set. Their statistical distributions are unknown, however, so there is no standard against which to compare the estimated values of these two indices.

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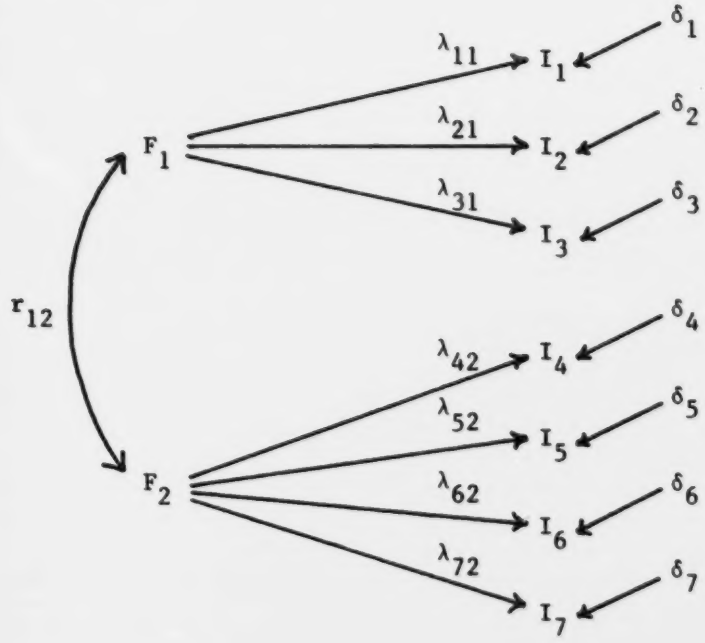
[1]Degrees of freedom are defined as the number of observed correlations--which equals $J(J+1)/2$, where J is the number of items--less the number of independent parameters (unconstrained λs).

FIGURE III.1

ILLUSTRATION OF CONFIRMATORY FACTOR ANALYSIS MODEL



We utilized confirmatory factor analysis as an exploratory technique. Our analysis proceeded as follows. Initially we devised a preliminary grouping of the 26 location considerations. This was accomplished without viewing the data. Once we had this preliminary grouping, we estimated a confirmatory factor model for the general location considerations. After examining these results we respecified and reestimated the model, and we proceeded in this manner until we had obtained a satisfactory model. We then attempted to estimate this model separately for alumni and non-alumni physicians and for the specific location considerations. Further modifications were necessary before we could define a model acceptable in all these settings.

To estimate the models, the goodness of fit statistics, and the factor loadings, we used the LISREL computer program (Joreskog and Sorbom, 1981). LISREL is a statistical analysis program designed to produce maximum likelihood estimates of structural models involving unmeasured variables by using the observed relationships among measured indicators of these variables. The user specifies a structural (causal) model and one or more measurement models. Confirmatory factor analysis utilized only the measurement model capacilities of LISREL. For reasons explained below we chose not to use LISREL to estimate structural models of location choice.

Our ultimate objective in using constrained factor analysis is to determine the best grouping of the 26 items into a smaller number of interpretable subsets. Once we have arrived at the best grouping, we may then use the factor loadings to construct empirical estimates of physicians' scores on the several factors.[1] The results of the model estimation itself do not provide direct evidence that one factor is more important than another. However, with the estimates of physicians' factor scores we can then proceed to obtain such evidence in two ways. First we can compute mean scores over all physicians and over the key groups of physicians and thus determine which kinds of preferences the physicians themselves felt were most important and how this differed among the groups. Second, we can regress indicators of location choice on the factor scores and determine which kinds of preferences were most closely related to physicians' actual location decisions. The results of these analyses are described in separate sections below.

b. Findings: Ranking Factors Reported as Influencing Location Choices

In this section, we summarize the results of the analysis of these responses. The analysis focused on several issues:

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[1]The factor loadings express the latent factors as a function of the observed indicators. Thus they reverse the direction of the arrows in Figure IV.1. The LISREL program computes these factor loadings as part of its optional output.

- frequency of responses indicating that a factor was influential in determining the general and specific location choice, by type of physician and by location of practice

- frequency of responses that a factor was most important in the general and specific location choice, by type of physician and location of practice

- ranking of factors, weighted by the frequency with which they were indicated as first, second, and third most important by respondents, for the general and specific location decisions, by type of physician and location of practice

- correlation analysis to determine the associations between different factors and between general and specific factors

- confirmatory factor analysis

Results of each of these analyses are discussed in this section.

Overall frequencies of responses. Frequencies of responses that a factor was important in the general location choice are presented in Tables A.4 and A.6 and frequencies of responses that a factor was important in the specific location choice are shown in Tables A.5 and A.7.

Examination of the data on factors influencing the general location choice reveals that:

- The three factors which were most frequently indicated as influencing the general location decision are:

  -- Climate or geographic features of area (78%)
  -- Preference for urban or rural living (77%)
  -- Availability of hospital facilities and personnel (64%)

- Other factors which were frequently indicated were:

  -- High medical need in area (59%)
  -- Recreational and sports facilities (52%)
  -- Influence of spouse (50%)
  -- Income potential (45%)
  -- Quality of educational system for children (45%)
  -- Opportunity for regular contact with other physicians (44%)
  -- Opportunity to join a desirable partnership or group practice (40%)

- The factors which were least frequently cited as influential in the general decision were:

  - -- Opportunity to work with a specific institution (4%)
  - -- Advice of an older physician (7%)
  - -- Availability of good social service, welfare, or home care services (12%).

When the frequency of indications of influencing factors for the general decision are examined by location of the physician's practice, we find that physicians in HMSA locations are less likely to state that income potential is important, are slightly more likely to cite high medical need in the area as important, are somewhat less concerned about the availability of hospital facilities and personnel, and are less likely to indicate that opportunities to join a partnership or group practice were influential. Although responses of physicians in whole and part-HMSAs were consistently different from responses of physicians in non-HMSAs, those located in part HMSAs were less concerned about income potential, less concerned about high medical need, were more concerned about hospital availability and more interested in group practice opportunities, than were physicians in whole HMSAs.

Examination of responses by type of physician--NHSC alumni, PPOs, non-alumni--reveal a different pattern:

- NHSC alumni, when compared to non-alumni, are

  - -- less concerned about income potential
  - -- less likely to indicate that they grew up in a similar area
  - -- much more likely to say the choice was influenced by a loan forgiveness program
  - -- more likely to be influenced by their spouse
  - -- more frequently influenced by high medical need in area
  - -- somewhat more likely to indicate having completed medical school or internship in the area
  - -- less likely to have followed the advice of an older physician
  - -- more likely to cite the efforts of the community to recruit them
  - -- somewhat more influenced by opportunties to be involved in community affairs
  - -- somewhat less likely to cite a preference for urban or rural living
  - -- much more likely to consider the availability of good social service, welfare, and home care services
  - -- more interested in opportunities for contact with a medical school

-- more interested in regular contact with other physicians, but less likely to be influenced by partnership or group practice opportunities
-- more frequently influenced by CME access.

PPOs depict patterns different from both alumni and non-alumni. Income opportunities appear to be a more influential factor for this group than for other physicians. For all other factors, however, PPOs were equally or less likely to indicate that they were influential. This result suggests two possibilities:

1) PPO's decisions were dominated by the NHSC opportunity list

2) Some PPOs may view their current location as temporary and, therefore, did not give as much consideration to the decision as did the other physicians who, presumably, were selecting a permanent location.

The fact that there was little difference in the frequency of responses by HMSA-nonHMSA location, but considerable differences between NHSC alumni and non-alumni responses suggests that the interrelationship of NHSC status and location may be important. In Table A.6, frequencies of responses to the general location question are presented, by physician-type and by location, jointly.

- For non-alumni, those choosing part-HMSA locations indicate that they were <u>less frequently</u> influenced by income potential

- Non-alumni in whole HMSA locations were <u>least concerned</u> about hospital availability or contact with other physicians

- Non-alumni in HMSAs were <u>more frequently</u> influenced by
  -- high medical need of area
  -- preference for urban or rural living

- Among NHSC alumni, those who chose non-HMSA practice were <u>more concerned</u> with
  -- income potential
  -- climate and geography
  -- spouse preferences
  -- family, and friends preferences
  -- quality of educational system
  -- prosperity of the community
  -- opportunities to join a group or partnership practice
  -- CME

  than were alumni in whole county HMSA locations

- However, alumni who chose whole HMSA locations differed from alumni in non-HMSA and part-HMSA locations by being least concerned about:
  - -- income potential
  - -- influence of spouse
  - -- quality of education
  - -- prosperity of community
  - -- preference for urban/rural living
  - -- availability of group practice

  and more concerned about:
  - -- high medical need
  - -- community recruitment efforts
  - -- availability of loans to begin practice

Overall, these findings suggest that alumni and non-alumni who choose whole HMSA practice locations tend to have different preferences than physicians who choose non-HMSA or part-HMSA locations.

As a final issue for the general location choice, we examined differences between M.D. and D.O. non-alumni in their preferences: D.O.s appear very different from M.D.s in several ways:

- D.O.s are <u>more concerned</u> about
  - -- income potential
  - -- influence of family or friends
  - -- high medical need in area
  - -- advice of older physician
  - -- influence on community affairs (D.O.s in non-HMSAs, only).
  - -- availability of loans for beginning practice
  - -- opportunity to work in a specific institution

- D.O.s are <u>less concerned</u> with
  - -- climate/geographic features
  - -- spouse's influence
  - -- cultural advantages
  - -- opportunities or joining a partnership or group practice (in nonHMSAs, only)
  - -- access to CME (HMSAs, only).

Overall, it appears that D.O.s may be more strongly influenced by economic considerations then are M.D.s.

When we examine the responses on the factors which were influential on the choice of the <u>specific</u> community in which physician are currently located (Tables A.5 and A.7), we find that:

- In general, the frequency that a specific factor is indicated is lower for the specific choice than for the general choice. This supports the two-stage decision process which we had hypothesized; once a physician has identified a set of communities which meet a general set of criteria, the variation in characteristics within that set becomes less important for the specific decision.

- The 10 factors which were indicated most frequently as influencing the general location decision are also the 10 most frequently cited for the specific location decision

- The frequency of response increased from the general to the specific decision for
  - -- opportunity to join a partnership or group practice
  - -- opportunity to work with a specific institution
  - -- organized recruitment efforts of community
  - -- advice of an older physician

  This result suggests that once young physicians have identified a set of communities which meet their general criteria, the specific opportunities in those communities become more influential on the final choices.

- The differences observed, by location and by type of physician, in the influence of factors on the general location choice appear consistent when these subgroups' responses are compared for the specific location decision.

Frequency of response that a factor was important.

Respondents were asked to indicate which factors were the first, second, and third in importance of those which influenced their general and specific location choices. The frequency of response that a factor was important, by type of physician and location of practice, are shown in Tables A.8-A.11:

- For all respondents, the factors indicated of primary importance on the general decision were
  - -- climate/geography
  - -- preference for urban or rural living
  - -- high medical need
  - -- influence of spouse
  - -- opportunity to join a partnership/group practice
  - -- availability of hospital facilities
  - -- income potential

-- growing up in such a community
-- recreational and sports facilities
-- influence of family and friends

This list is somewhat different from the overall frequencies

-- "having grown up in a similar community" is not in the 10 most frequently indicated list, but is the eighth most frequently indicated important factor. Evidently, when this factor is present, it becomes a major factor.
-- "influence of family or friends" is also not dominant as an overall factor, but ranks among the important factors

o When the specific factors which are ranked as important are compared with the general factors, they are essentially an identical set, with the exception that "organized efforts of the community to recruit physicians" is added to the list--being cited as frequently as the other factors.

When "scores" are assigned to the responses to weight by whether a factor was indicated as first, second, or third in importance (Tables A.12-A.15), the 10 most important general factors are those 10 which were most frequently cited as important to the general decision, although some minor variations in the rank of each factor are present. For the specific decision, when a weighted ranking is constructed:

o "influence of family and friends" and "organized efforts to recruit physician" drop out of the top 10 factors list

o "quality of educational system for children" becomes one of the 10 most important factors.

These results, overall, indicate a consistency in the responses of young physicians about their preferences.

Confirmatory factor analysis

Based upon a priori considerations we developed a preliminary grouping of the 26 items under nine general factors. This classification is displayed in Figure III.2. Two of the factors are represented by a single item each. Neither of these two items appeared to belong unambiguously to any of the other groupings. "High medical need" might refer to either economic or professional considerations or might even reflect more purely altruistic motives. Similarly, while it is possible that "advice of

FIGURE III.2

PRELIMINARY GROUPING OF 26 LOCATIONAL PREFERENCE ITEMS INTO NINE FACTORS

Economic
- a. Income potential (INCOME)
- q. Prosperity of community (PROSPER)
- d. Payment of "forgiveness loan" (FORGIVE)
- x. Availability of loans for beginning practice (LOANS)

Physical Surroundings
- b. Climate or geographic features of area (CLIMATE)
- r. Preference for urban or rural living (URBAN)

Social/Cultural
- l. Opportunities for social life (SOCIAL)
- m. Recreational and sports facilities (SPORTS)
- p. Cultural advantages (CULTURE)

Community
- k. Organized efforts of community to recruit physicians (RECRUIT)
- o. Prospect of being more influential in community affairs (INFLNCE)
- t. Availability of good social service, welfare or home care services (SERVICE)

Prior Residence
- c. Having been brought up in such a community (BROUGHT)
- h. Influence of preceptorship program (PROGRAM)
- i. Having gone through medical school, internship, residency or military service near here (NEAR)

Family
- e. Influence of wife or husband (SPOUSE)
- f. Influence of family or friends (FAMILY)
- n. Quality of educational system for children (SCHOOLS)

Advice of Fellow Physicians
- j. Advice of older physician (ADVICE)

Professional
- v. Opportunity for regular contact with other physicians (DOCTORS)
- w. Opportunity to join desirable partnership or group practice (PARTNERS)
- s. Availability of hospital facilities and personnel (HOSPITL)
- u. Opportunity for regular conact with a medical school or medical center (MEDSCOL)
- z. Access to continuing medical education (MEDED)
- y. Opportunity to work with specific institution (INSTUTE)

Area Needs
- g. High medical need in area (NEED)

older physician" might represent a form of family influence, we felt that the distinction between another physician and the physician's own family needed to be maintained.

Two of the factors, Economic and Professional, comprise items that could be divided further into subfactors. We have ordered the component items to highlight these possible subgroupings. "Income potential" and "prosperity of community" represent rather different kinds of economic considerations than "loan availability" and "forgiveness loan," and we would not have been surprised to find that we would improve the fit of our factor model by separating them. Likewise, four of the items under Professional considerations relate to the presence of a hospital or medical center while the other two mention only physicians. We might have expected to find evidence of distinct factors here as well.

The next step consisted of examining the correlations among the items to see whether there were patterns that suggested any obvious changes in the preliminary classification scheme. Because the items are dichotomous, the familiar product-moment correlation, which assumes bivariate normality between any two variables, is not entirely appropriate. If factor analysis is applied to such correlations it may yield erroneous results with respect to the factor structure and biased estimates of the factor loadings (Olsson, 1979). A more appropriate statistic is the tetrachoric correlation, designed specifically for a pair of dichotomous variables. The tetrachoric correlation is based on the assumption that the observed distribution of item values across two categories is the manifestation of an underlying normal distribution. The calculation of tetrachoric correlations is cumbersome, although algorithms suitable for computer have been developed. The LISREL program includes the calculation of tetrachoric and polychoric correlations as a user-selected option.

We computed both tetrachoric and product-moment correlations among the 26 general and 26 specific location preference items. These are presented in tables A.16 and A.17. The tetrachoric correlations form the lower triangle in each matrix. A comparison of the two kinds of correlations for the same pairs of items shows that the tetrachoric correlations are 1-1/2 to 3 times as large as the product-moment correlations. For example, the product-moment correlation between the general items INCOME and FAMILY is .04, and the tetrachoric correlation is .07; the product-moment correlation between INCOME and PROSPER is .31, while the tetrachoric correlation is .51. There is no simple pattern in the relative sizes of the two correlation coefficients.

When the correlation between the "general" and "specific" factors indicated by each respondent is calculated (Table A.18) it is evident that there is a relatively high level of consistency in these responses. However, the correlations range from .48 to .68--again suggesting the location decision process may be a two stage one, with different factors being emphasized in each stage.

Inspection of the matrix of correlations is useful in identifying potential problems with a proposed factor structure prior to actually

estimating the model. Generally speaking, items grouped together should be more highly correlated with each other than with items from other groupings. In addition, items from a given grouping should exhibit consistency in the relative strength of their associations with items from other groupings. Thus if the first item in a given grouping has the strongest correlation with the first item in another grouping, it should also have the highest correlation with each of the other items in that grouping and in other groupings as well.

Consider the preliminary Economic factor. The general preference items INCOME and PROSPER do exhibit a strong tetrachoric correlation at .51, one of the highest in the matrix (Table A.16, lower triangle). The item LOANS shows moderate associations with both INCOME (.33) and PROSPER (.22), but the fourth item FORGIVE, is unrelated to either INCOME (-.01) or PROSPER (.02) and only weakly related to LOANS (.13). The strongest correlation that FORGIVE attains with any other variable is .18 with INSTUTE and NEED. Clearly FORGIVE does not represent the same underlying economic factor as INCOME and PROSPER, and neither does it fit intuitively with INSTUTE and NEED. Ultimately we opted to exclude FORGIVE from the confirmatory factor analysis. For similar reasons we also chose to exclude six other items: BROUGHT, PROGRAM, NEAR, FAMILY, ADVICE, and INSTUTE.

Evidence of another kind of problem affecting the fit of a confirmatory factor model is seen in the relationships between INCOME and PROSPER and items outside the preliminary Economic factor. The correlation between PROSPER and SCHOOLS is .53, not significantly different than that between PROSPER and INCOME. This would suggest combining SCHOOLS with PROSPER and INCOME, but INCOME and SCHOOLS are correlated only .33 whereas four other variables have correlations of .40 or higher with SCHOOLS.

The item SPORTS illustrates a similar kind of problem. Initially we placed this item together with SOCIAL and CULTURE. The correlations among those items largely support this specification. SOCIAL and CULTURE are correlated .59; SOCIAL and SPORTS, .53; and CULTURE and SPORTS, more weakly at .39. As we have noted, SOCIAL and CULTURE are fairly highly correlated with PROSPER and SCHOOLS. However, SPORTS is correlated only .20 with PROSPER and .26 with SCHOOLS. Recalling Figure III.1, a model combining SPORTS, CULTURE, and SOCIAL in one factor and PROSPER and SCHOOLS in another will clearly tend to overstate the correlation between SPORTS and both PROSPER and SCHOOLS and understate the correlations between CULTURE and SOCIAL and these latter two items.

Yet another place where the correlations suggest difficulty in fitting a confirmatory factor model is among the items we have grouped under the preliminary Professional designation: DOCTORS, PARTNER, HOSPITL, MEDSCOL, MEDED, and INSTUTE. Within this cluster every item but INSTUTE is correlated at .5 or better with at least one other item, yet every one but DOCTORS shows at least some correlations considerably below this level. For example, DOCTORS and HOSPITL are correlated .61, and DOCTORS and MEDSCOL are correlated .50, but MEDSCOL and HOSPITL are correlated only .20. To place all of these items under a single factor necessarily means overpredicting the weak correlations and underpredicting the strong

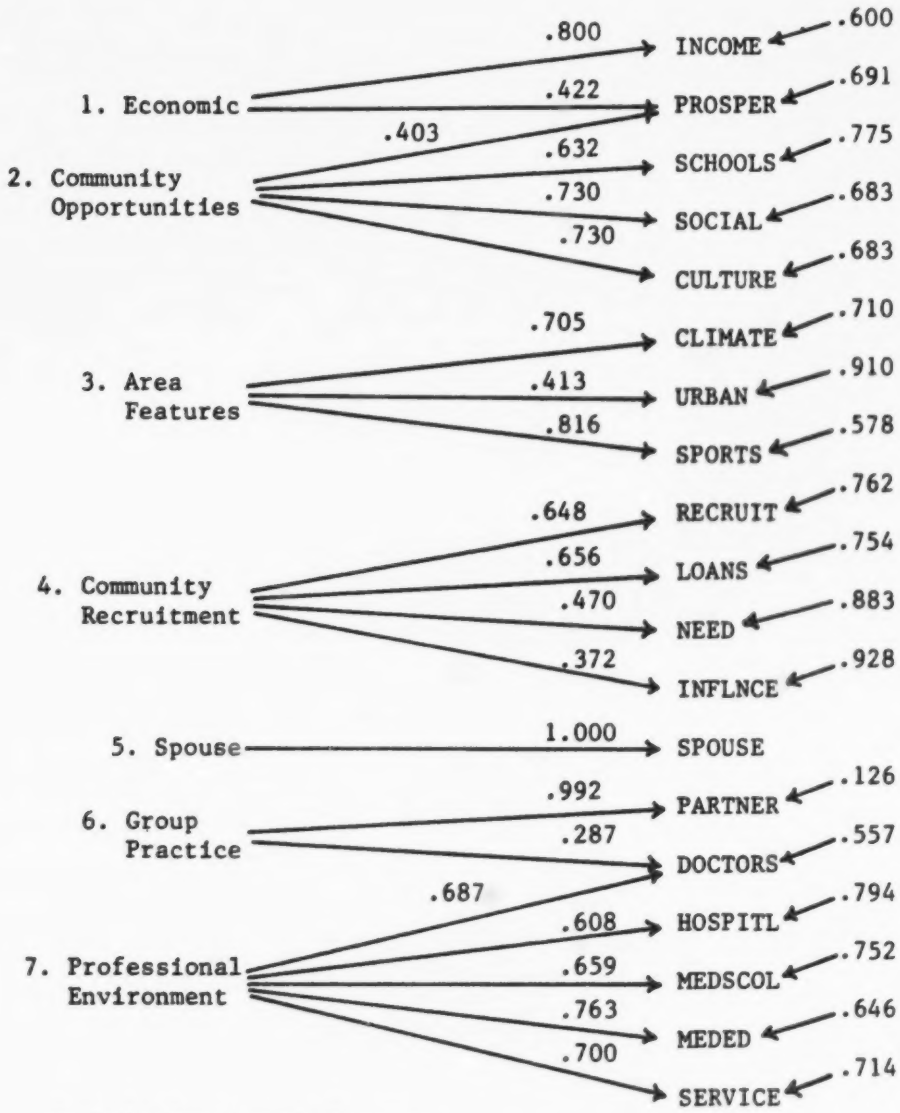
correlations by wide margins. Furthermore, some of these Professional items are related very strongly to items initially grouped under other factors. For example, DOCTORS, HOSPITL, MEDSCOL and MEDED have correlations with SERVICE ranging between .46 and .56, yet PARTNERS and SERVICE are correlated only .21. Similarly, DOCTORS shows correlations with PROSPER, SCHOOLS, SOCIAL and CULTURE that equal .36, .41, .44 and .41, respectively. HOSPITL shows even stronger correlations with PROSPER and SCHOOLS (.49 and .48) but weaker associations with SOCIAL and CULTURE (.37 and .27). MEDSCOL is weakly associated with the first three (.22 to .23) but strongly associated with CULTURE (.44). These patterns indicate that it will be difficult to devise a factor structure that does not produce sizable errors in at least some of the predicted correlations. In our effort to derive a factor structure that satisfactorily fits the data we tested specifications that included adding SERVICE to a redefined Professional factor, splitting off PARTNER from many of the other Professional items, and creating common factors for some of the Professional, Economic and Social/Cultural items.

Altogether we tested 18 different specifications, focusing our exploration most heavily on the general location preferences and the full sample. In evaluating alternative specifications of confirmatory factor models it is customary to examine both the overall goodness of fit and the pattern of fit (i.e., which correlations are reproduced especially poorly or particularly well), as well as the plausibility of the parameter estimates. For two reasons we found the goodness of fit statistics to be not particularly helpful. First, the overall goodness of fit was surprisingly similar across the different specifications; no model stood out as markedly better or markedly worse than the others in this respect. Second, many of the model specifications yielded out of range parameter estimates (λ coefficients in excess of 1.0) or, more commonly, inter-factor correlation matrices or error variance-covariance matrices that were not positive definite. For this reason, we directed our efforts at devising specifications which would yeld estimates that satisfied very basic criteria for acceptability.

For the full sample, using 19 general location preferences, we found only two models that were acceptable with regard to these latter criteria. One of these models was also satisfactory for the specific location preferences, so we chose this as our final model. The model is depicted in Figures III.3 and III.4, together with the estimated λ coefficients, δ terms, and latent factor correlations. The model posits seven factors, one of which has but a single indicator (SPOUSE). The other factors are Economic, which is indicated by INCOME and PROSPER; Community Opportunities, indicated by PROSPER, SCHOOLS, SOCIAL and CULTURE; Area Features, indicated by CLIMATE, URBAN and SPORTS; Community Recruitment, indicated by RECRUIT, LOANS, NEED and INFLNCE; Group Practice, indicated by PARTNERS and DOCTORS; and Professional Environment, indicated by DOCTORS, HOSPITL, MEDSCOL, MEDED and SERVICE. The Economic factor represents the income-earning opportunity in the community while the Community Opportunities factor refers broadly to other advantages of a prosperous community. The Area Features factor refers to the physical surroundings, with particular stress on recreational opportunities (especially for

FIGURE III.3

CONFIRMATORY FACTOR MODEL OF GENERAL LOCATION PREFERENCES

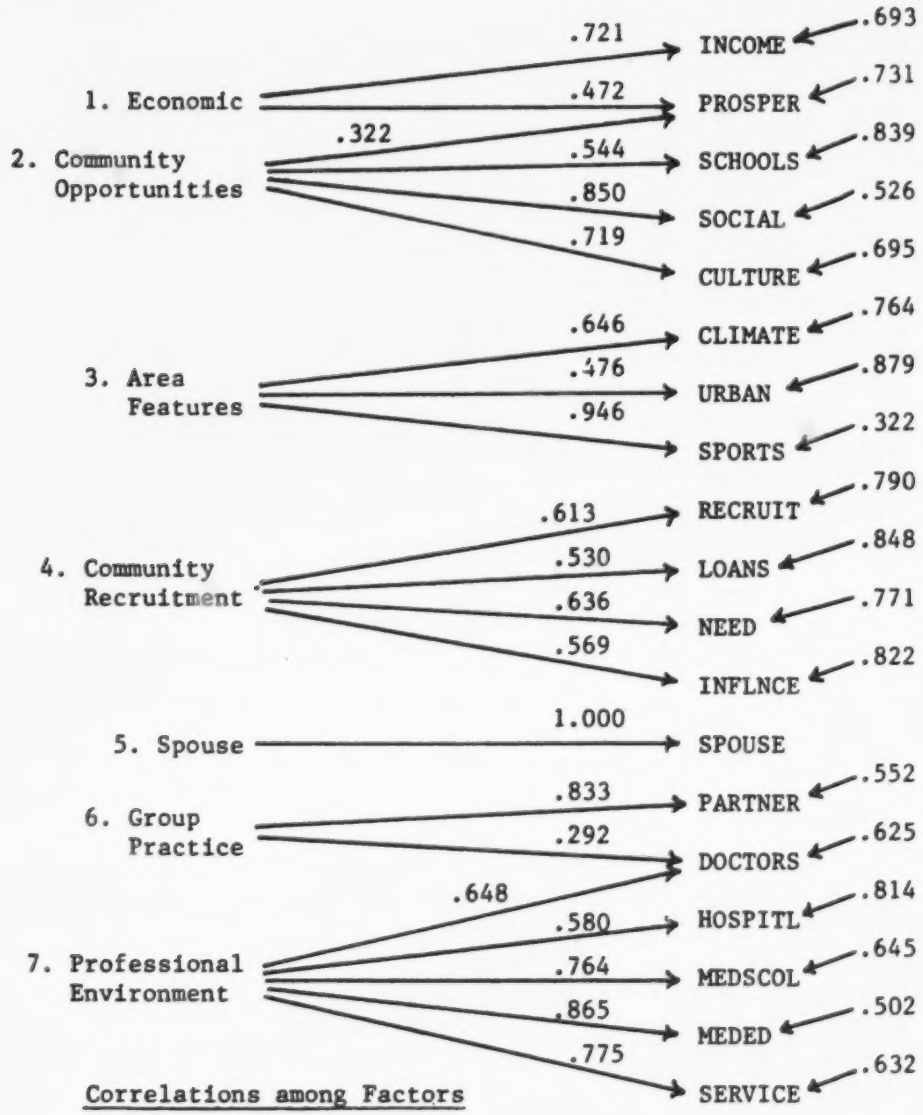


Correlations among Factors

1	1.000						
2	.536	1.000					
3	.194	.609	1.000				
4	.459	.301	.218	1.000			
5	.157	.345	.300	.137	1.000		
6	.217	.413	.232	-.062	.240	1.000	
7	.418	.693	.330	.444	.291	.345	1.000
	1	2	3	4	5	6	7

FIGURE III.4

CONFIRMATORY FACTOR MODEL OF SPECIFIC LOCATION PREFERENCES



Correlations among Factors

1	1.000						
2	.461	1.000					
3	.178	.669	1.000				
4	.396	.323	.273	1.000			
5	.073	.391	.234	.113	1.000		
6	.154	.186	.144	-.180	.167	1.000	
7	.401	.578	.308	.499	.249	.277	1.000
	1	2	3	4	5	6	7

specific location considerations), whereas the Community Recruitment factor encompasses a mixture of inducements to set up practice in a particular community. The Group Practice factor addresses potential partners and colleagues, and the Professional Environment factor summarizes the attendant features of medical practice in that community, including the opportunities for professional interaction and development.

The two most highly correlated latent factors in the general preferences model are Community Opportunities and Professional Enviroment, followed by Community Opportunities and Area Features. The same two pairs are the most highly correlated for the specific items as well, although their order is reversed. Other factor pairs showing moderately high correlations (.400 or better) are Economic and Community Opportunities, Economic and Community Recruitment, Economic and Professional Environment, and Community Recruitment and Professional Environment. Perhaps the most pronounced difference between the two sets of model estimates lies in the correlations among factors. For 15 of the 21 factor pairs the correlations are higher for general location considerations than for specific considerations. This evidence of greater structure among general location considerations is consistent with the theory of a two stage location decision process, where the small set of communities being considered in the second stage already satisfy basic requirements and exhibit little variation on key features.

The chi-square statistics for both models exceed 16 times their degrees of freedom, indicating highly significant differences between the predicted and observed correlations, but the goodness of fit indices are moderately high, at .830 and .822 for the general and specific models, respectively. If the confirmatory factor model were incorporated as a measurement model into a structural equation model of the relationship between unobserved preference factors and particular dependent variables (such as actual location), the overall fit would probably be much better. We opted against estimating the models within LISREL, because logistic regression provided a more appropriate method of estimating the effects of location preferences on a dichotomous preference variable.

As stated above, one of our objectives in performing the confirmatory factor analysis was to reduce the 26 preference items to a much smaller set of interpretable, general factors so that we might more easily assess the relative importance of alternative kinds of location considerations. Physicians' perceptions of the importance of individual factors would be measured by the factor scores themselves while evidence of the impact of subjective location considerations upon actual location decisions would be obtained by the logistic regression of a location choice indicator upon the factor scores. The models depicted in Figures III.3 and III.4 show how the variance of each preference indicator is fully explained by one or more general factors plus a unique effect (the sum of the squared paths leading into each indicator is 1.0). More importantly for our purposes, the model provides a basis for deriving empirical estimates of the unobserved general factors from the observed indicators. The LISREL program produces estimates of the loadings of each general factor on the individual items. After suitable adjustment the factor loadings yield sets

of weights such that factor scores bounded by 0 and 1 may be constructed for each physician respondent as weighted sums of that physician's responses to the appropriate location preference items (where an item is coded "1" if checked as important and "0" if not). The factor scores are scaled to the same range so that mean scores may be compared across factors.

The item weights for each factor are reported in Table A.19 for both the general and specific items. The use of the weights may be illustrated with reference to the general Economic factor. To construct an estimate of the Economic factor for an individual physician, we multiply the INCOME item (coded 1 or 0) by .577, the PROSPER item by .288, the RECRUIT item by .056, and the LOANS item by .079. The four weights sum to 1.00, insuring that the maximum score if the physician checked all four items will be 1 (the minimum score, if he checked no items, is obviously zero). Items which received very small factor loadings were excluded before the weights were computed. Note that for the general Group Practice factor only the PARTNERS item had an appreciable loading, so that factor (not shown in the table) was equated with the PARTNERS item. Similarly, the Spouse factor was equated with the SPOUSE item for both general and specific location preferences.

The weights are fairly similar between the general and specific items. The differences, in any event, do not suggest any particular pattern. Indeed, we would not expect systematic differences, given that the weights are based on the same factor model and that no other model provided a clearly better fit for either set of items. The most sizable differences are the increase in dominance of the SPORTS item in the Area Features factor between the general and specific considerations; the reduction in dominance of the INCOME item in the Economic factor; and the emergence of the DOCTORS item as a component of the Group Practice factor along with PARTNERS.

We hypothesize that location preferences which are themselves general in nature will have a greater effect as general preferences than as

---

[1]The adjustment is straightforward. The LISREL-produced factor loadings are analogous to standardized regression coefficients expressing the unobserved factor as a function of the observed items. The items with nonzero loadings on a given factor are not limited to those items which serve as indicators of that factor in the model specification, but the indicators do indeed receive the highest loadings. To adjust the loadings we would, in theory, first unstandardize them by multiplying by the ratio of the factor standard deviation to the individual item standard deviation, then rescale them by a common proportion so that they sum to unity. In reality we do not know the standard deviation of the factor, but that term is nullified out by the rescaling of the item weights to the 0,1 interval. Thus the adjustment operation entails first dividing each loading by the item standard deviation, then summing the results for each factor, then finally multiplying these intermediate results by the inverse of their sum.

specific preferences. The factor Area Features provides the best illustration of this in that the component items refer to the characteristics of a region, which might contain multiple, diverse communities. Any metropolitan location in southern California, for example, would provide the same area features in the sense that we have defined them here, yet such communities would offer great variety with respect to the other six factors. Only one other factor, Community Opportunities, would seem to exhibit this kind of generality, and this applies to just the SOCIAL and CULTURE items, not SCHOOLS or PROSPER. By contrast, the Spouse factor would appear to be at least as important a consideration for specific as for general location, and the Group Practice and, to a degree, the Community Recruitment factors might be even stronger as a specific than general location considerations. The remaining factors do not appear to be primarily general or specific.

A second hypothesis that we entertain, and one which is in accord with the view of the location decision as a two-stage process, is that general location preferences reflect the characteristics that physicians consider most important. Such preferences are used to narrow down the choices to a set of communities that satisfy these most critical requirements. Secondary considerations then affect the choice of a specific community.

Mean scores on the frequency of selection and the rated importance of the two sets of factors are reported in Tables A.20 and A.21, respectively. A general factor's score on the frequency of selection measure may be interpreted as the average proportion of times that an item representing that factor was indicated as being influential in determining the location decision. A factor's score on the rated importance measure may be interpreted as the average proportion of times that an item representing that factor was ranked either first, second or third most important in determining the location decision. For example, the Area Features factor received the highest frequency of selection score for general location considerations; the score of .576 may be interpreted to mean that, on average, 57.6 percent of all physicians selected one of the Area Features items (see Table A.20) as having been influential in their general location decision. This same factor received an importance score (Table A.21) of .230, indicating that 23 percent of all physicians rated one of the Area Features items as one of the three most important general location considerations.

Comparing the scores among all physicians, we find that as a general location consideration Area Features is rated most highly on frequency of selection but second most highly on importance. Spouse considerations rank highest on importance and second highest on frequency of selection, and Group Practice and Economic considerations rank third and fourth on both measures. The remaining three factors received very low scores on importance; for example, only 3.9 percent of physicians rated Professional Environment considerations among the top three.

Frequency of selection scores for specific location considerations are generally lower than for general location considerations, indicating that the physician respondents mentioned fewer items as having been

influential in their specific location decisions. For some of the factors the selection scores for specific location decisions are much lower than they are for general location decisions; for other factors they are only slightly lower. The Area Features score declines from .576 to .396, dropping it from first to second behind Spouse considerations and placing it only marginally above Group Practice concerns. This lesser significance of Area Features considerations for specific than general location considerations is even more evident in the importance scores. (Note that these scores necessarily maintain their same average level between the general and the specific, as each respondent picked three items as the most important specific considerations and three as the most important general considerations.) The Area Features score falls from .230 on general considerations to .142 on specific considerations, whereas the Spouse score rises from .238 to .247, and the Group Practice score rises from .207 to .229. The other changes are minimal. The most pronounced difference between general and specific location considerations, therefore, is the reduced role of Area Features. Given that this factor was clearly the most general of the seven, this result is not at all surprising. The somewhat greater relative importance of Spouse, Group Practice, and Community Recruitment considerations for specific than general location decisions is also consistent with our reading of the potential specificity of these factors, but the differences in magnitudes are very small.

Except for the change in the relative importance of Area Features, the factors that were important as general location considerations continue to be important as specific location considerations. There is little evidence in support of our second hypothesis above--namely, that physicians make general location decisions on the basis of what they view as the most important considerations, and then after narrowing their choices make specific location decisions on the basis of a different and less important set of considerations.

A comparison of NHSC alumni and non-alumni shows considerable similarity in their rating of the different factors, whether on frequency of selection or rated importance. However, non-alumni assign far more importance to Group Practice considerations than do alumni. As a general consideration, Group Practice has an importance score of .273 among non-alumni versus only .108 among alumni. As a specific location consideration, Group Practice received an importance score of .295 among non-alumni versus .125 for alumni. The frequency of selection scores show alumni placing relatively more emphasis than non-alumni on the Professional Environment and Community Recruitment.

The differences between physicians in HMSA and non-HMSA locations parallel those between NHSC alumni and non-alumni, except that the two groups give comparable weight to Professional Environment. The non-HMSA physicians also give relatively greater weight to Area Features and Community Opportunities than do the HMSA physicians, tendencies which was not very strong in the comparison of non-alumni and alumni.

Results of the confirmatory factor analysis suggest that there are differences in location preferences of NHSC alumni and non-alumni, and that

physicians who choose HMSA practice are influenced by different considerations than are physicians who locate in non-HMSAs. These findings can be used to model location choices of young physicians. Analysis of factors influencing individual physicians location decisions is discussed and reported in Section D, below.

3. Prior Contact Analysis.

The extent to which physicians have had prior contact with a specific area or type of area has been demonstrated to be associated with the probability that the physician will choose to locate an initial practice in that or a similar area. (Yett and Sloan, 1974; Budde and Langwell, 1978.) The 1984 Survey of Young Physicians in Non-Metropolitan Areas collected data on several prior contact events:

- o birthplace (B)
- o rearing (R)
- o spouse rearing (S)
- o college (C)
- o medical school (M)
- o residency (G)
- o NHSC service (N)

a. Methodology The prior contact responses were used to identify whether the physician had been in rural areas prior to the current location choice. This information was used to examine three hypotheses:

HYPOTHESIS 1: The more contact a physician has with rural locations, the more likely he/she is to locate an initial practice in a rural area[1].

HYPOTHESIS 2: The more contact a physician has with rural locations, the more likely he/she is to locate an initial practice in a rural HMSA.

---

[1]Since most of our sample is located in non-metropolitan areas, this hypothesis can only be tested using data from the 1979 MPR NHSC sample.

HYPOTHESIS 3: More recent contacts with rural areas will have a stronger effect than more distant (in time) events.

Analysis of these data to test these hypotheses was conducted by constructing probability tables which relate the number of prior events to the probability that a physician will locate in a rural area or in a HMSA, for selected physician groups. The results of this descriptive analysis are of interest, in general, and also provided information to permit refinement of the specification of the empirical model.

b. Findings: Prior Contact Analysis

Prior research suggests that physicians will be more likely to locate in areas with which they have had prior contact and that more recent contacts have a greater influence on the location choice than do contacts more distant in time. For NHSC alumni, the prior contact events in rural areas examined are:

- o birth
- o rearing
  - -self
  - -spouse
- o college
- o medical school
- o residency
- o NHSC service

The NHSC experience represents the most recent rural prior contact event for most alumni; for non-alumni, prior contacts are more distant in time--during residency training or earlier. Thus, to the extent that prior contact is a factor in location choices, the NHSC may be viewed as a mechanism for introducing a prior contact event into the physician's background, and doing it at a point which immediately precedes the location decision of many young physicians.

Examination of the data indicates that a substantial proportion of the survey respondents had had no prior contact with rural areas, other than the NHSC experience for alumni:

	No prior contact events Located in rural areas	
	No.	Percent
Non-Alumni	280	40.0%
NHSC Alumni	159	57.4%
	Located in HMSAs	
	No.	Percent
Non-Alumni	147	43.2%
NHSC Alumni	130	58.8%

It is interesting that 40 percent of non-alumni in rural areas, and 43 percent in HMSAs, had no prior contact with rural areas. The impact of the NHSC experience is evident in the finding that a much higher percent of NHSC alumni (57-58%) had no prior contact with rural areas, except for their NHSC assignment. Thus, the NHSC program may influence alumni to locate in rural and HMSA areas at a rate up to 17 percent higher than non-alumni, for those with no prior contact with rural areas. However, this apparent effect may be due to differences in other personal and professional characteristics of the two groups.

In Table A.22, we examine the frequency of specific prior contact events for physician respondents, by type of physician and by selected characteristics. Among all young physicians, 40 percent report being born and over 40 percent were reared in a rural area. However, among alumni and PPOs, only about 30 percent indicate each of these early prior contact events. For non-alumni, on the other hand, early prior contact events are reported by nearly 50 percent of M.D.s and by 58 percent of D.O.s. In addition, these non-alumni indicate higher proportions of spouse's rearing in rural areas, and more frequently attended college in rural areas.

It is noteworthy that alumni and PPOs report more frequently (though in small numbers) that they attended medical school or completed a residency program in a rural area. Combined with the NHSC experience in a rural area (for 97% of alumni and 100% of PPOs), this suggests support for the hypothesis that more recent contacts have a stronger influence on the location decision than do more distant in the past contacts.

In Table A.23, we limit our examination to the cohort of NHSC alumni who responded to both the 1979 and 1984 surveys, and consider the association between the number of prior contacts and the rural vs urban location choice. Of those who located in rural areas, only 70 alumni had had more than 1 prior contact with rural areas before choosing a rural practice location. Since the NHSC experience represents the single prior

contact event reported by the majority of alumni, it appears that, of 61 percent of 1979 alumni in this category, 40 percent were retained in rural practice. Of those with 2 prior contact events, 53 percent were practicing in rural areas; with 3 prior contact events, 44 percent were practicing in a rural area. It is interesting that of those 1979 alumni with no prior contacts (i.e. they completed NHSC service in a metropolitan site), half are now practicing in a rural areas; the small number in this group, however, suggests generalization from this finding is not appropriate.

The overall interpretation of the prior contact analyses can be summarized as:

- The NHSC experience is the final and most influential prior contact event for most alumni and appears to be associated with both rural and HMSA location choices

- The number of prior contact events does not seem to be strongly associated with the rural or HMSA location decision. It seems likely that the use of "number of prior contact events" may oversimplify the relationships involved, by mixing "personal" (i.e. birth, rearing, spouse rearing, college) and "professional" (i.e. medical school, residency, NHSC service) contact events

- As we anticipated, rural prior contact events, other than NHSC experience, do not appear to have an effect on the decision to practice in a HMSA; physicians who have been reared or educated in rural areas are no more likely to choose HMSA practice than are physicians without rural prior contacts.

These findings have been used to guide the multivariate analyses which are described and reported in the next section.

D. MULTIVARIATE ANALYSIS OF INDIVIDUAL PHYSICIANS' LOCATION CHOICES

In Chapter II, we have discussed in detail the previous research findings and gaps in the literature on physicians' location choices and hypotheses were presented. In this section, we describe our methodological approach to analyzing the factors which have influenced the individual physician's location decisions. This analysis focused on three groups:

(1) For 1979 NHSC physicians, we analyzed the rural-urban location choice; then, for rural physicians, the rural non-HMSA/rural HMSA location choice was analyzed.

(2) For the full sample (excluding urban 1979 NHSC respondents), the rural non-HMSA/rural HMSA choice was analyzed.

(3) For NHSC alumni, the choice to remain in the NHSC site after completing a service obligation or to re-locate has been analyzed.

1. Methodology

For this study, we assume that the major determinants of a location choice are the personal characteristics of the physician, defined by the vector (X_1), professional characteristics of the physician (X_2), the stated preferences of the physician (X_3), the actions of community recruiters and other local professionals as perceived by the physician (X_4), and programs designed to influence location choices as reported by the physician (X_5). The analysis of individual physicians' location decisions was conducted using the maximum likelihood method of LOGIT analysis. With a qualitative dependent variable, the appropriate and more efficient analytic technique is LOGIT (Werner, Wendling, and Budde, 1978). A full discussion of multivariate log-linear and logistic models and of the computional techniques which will be used for this analysis is provided in the SAS manual (1983).

The analysis was conducted for the following dependent variables and samples:

(1) CHOICE 1: The probability of rural location was estimated for the 1979 NHSC cohort.

(2) CHOICE 2: The probability of HMSA location was estimated for the full sample (excluding 1979 urban physicians) and for subsamples.

- (a) -- NHSC physicians only
- (b) -- Non NHSC physicians only
- (c) -- M.D.s only
- (d) -- D.O.s only

(3) CHOICE 3: The probability of NHSC site retention was estimated for the full NHSC alumni sample.

In the NHSC only equations, the characteristics of the NHSC site in which the physician served are included as explanatory variables.

Table III.1 defines the variables included in this analysis.

2. Findings: Multivariate Analysis of Individual Physicians' Location Choices

We initially examined the model descriptively by calculating the mean values of explanatory variables included in each analysis, by the

choice alternatives being examined (Table A.24). Results indicate some differences, as would be expected:

- o CHOICE 1: 1979 NHSC alumni who chose to practice in a rural rather than urban area

  -- had spouses with higher educational attainments
  -- reported more rural prior contact events
  -- were more likely to be D.O.s
  -- were more satisfied with their NHSC experience

  The NHSC sites in which rural alumni had been assigned

  -- were more populous but less densely populated
  -- had fewer physicians
  -- were more likely to have a hospital

- o CHOICE 2: Physicians choosing HMSA locations rather than non-HMSAs, tended to have graduated more recently, to have less well educated spouses, to have had fewer early contacts with rural areas, and to be general/family physicians.

  When means of explanatory variables for CHOICE 2 are examined by type of physician, some differences emerge:

  -- Alumni who choose HMSA locations are somewhat more likely to be female
  -- D.O.s who chose HMSA practice tended to have graduated earlier, to have made their location decision later, to have better educated spouses, and to report more early and professional contacts with rural areas.

- o CHOICE 3: NHSC alumni who remained in the HMSA in which they served their NHSC obligation

  -- made their location decision later
  -- were more likely to be male
  -- had more early and professional prior contacts in rural areas
  -- were more likely to be GP/FPs
  -- were more likely to be D.O.s

  Overall, retained alumni had served in NHSC sites which had

  -- lower population
  -- fewer physicians
  -- lower population density and were more likely to express satisfaction with all aspects of the NHSC experience

Results of the initial multivariate analysis of individual physicians' location decision which excludes stated preferences, were generally disappointing (Appendix B). Few of the explanatory variables were significant and the R^2 for the estimated models range from 0.0 to 0.08. Results suggested that:

(1) Satisfaction with the NHSC experience has a positive effect on the probability of locating in a rural area.

(2) The NHSC experience has a positive effect on the probability that a physician will locate in a HMSA

(3) Early rural prior contact events, unrelated to professional experience, appeared to influence young physicians to choose non-HMSA locations -- perhaps because they locate in the specific rural area where they were born and/or reared.

(4) Other personal and professional characteristics of physicians appear to have little or no relationship to the location choices examined.

Clearly, these findings shed little light on the location decisions of rural physicians, other than ruling out several hypothesized effects. The findings fall short of suggesting ways in which the HMSA location tendencies of physicians can be strengthened, whether by intensifying recruitment efforts among particular classes of medical students or by boosting special incentives. Moreover, they leave unanswered what aspects of the NHSC experience contributed to the HMSA location decision favored by alumni.

The inclusion of location preferences within the logistic regressions can inform the analysis of location choice in two basic ways. First, adding measures of such preferences to the set of potential explanatory variables may yield additional insight into what determines location decisions. This is particularly true within the alumni and non-alumni samples, where there is no NHSC-non-NHSC distinction. Second, inclusion of such measures in the model for all physicians may help to explain the strong relationship between NHSC participation and the HMSA location decision. Here we ask how the addition of these variables affects the NHSC coefficient. A reduction will indicate that the effect of NHSC participation operates in part through location preferences--possibly by shaping such preferences. If the NHSC instead selects medical students with particular kinds of preferences, then the NHSC coefficient will be unchanged while the net effects of the preference measures will be diminished by the inclusion of the NHSC variable. This can be investigated by first estimating the all-physician model without the NHSC variable and then adding it to the specification.

Table III.2 reports results from the logistic regression of HMSA choice on the general and specific location preference factors for all physicians and separately for NHSC alumni and non-alumni. Only those factors with statistically significant or near significant effects are included in the equations. Six factors plus the separate PARTNERS and SPOUSE items appear in one or more equations. The Economic, Community Recruitment, Area Features and Group Practice/PARTNERS factors appear in the full sample equations for both the general and specific location considerations. The Community Recruitment factor also appears in both non-alumni and alumni equations. The PARTNERS item appears either alone or as the principal contributor to the Group Practice factor in all six equations. The Economic and Group Practice/PARTNERS factors have negative effects on HMSA choice throughout the equations while the Community Recruitment factor has a consistent positive effect.

The preference factors account for a greater proportion of the variance of HMSA choice in the full sample than within the separate alumni and non-alumni subsamples, suggesting that part of their effect in the full sample is related to their discriminating between NHSC participants and non-participants. The specific location factors account for less than half as much of the variance of HMSA choice within the subsamples as they do among all physicians. The general location factors account for nearly as much of the variance of HMSA choice in the non-alumni subsample as among all physicians, but they account for much less of the variance in the alumni subsample.

For two factors we find marked differences in the effects of general and specific location preferences. Community Recruitment exhibits stronger effects as a specific than general preference, and this is evidenced in the full sample and (more strongly) in both subsamples. We might have anticipated this finding if the individual items that make up this factor had referred more explicitly to community actions (as opposed to characteristics), but only the RECRUIT item is of this nature (see Table A.19). We speculate that the factor combines this element with considerations (reflected in LOANS and NEED) that become important once the physician begins to choose among a small set of communities that satisfy more basic criteria.

Consistent with our expectations, the Area Features factor displays more pronounced effects as a general than specific location consideration. This factor appears in both full sample equations, but the general location coefficient is nearly half again as large as the specific location effect. The effect is negative, implying that physicians concerned about the physical features of their environment are less likely to chose a HMSA location. The effect is much stronger among NHSC alumni than among all physicians. There is no effect among non-alumni, and there is no effect of specific preference considerations among either subsample.

The general factors do not exhaust the explanatory power of the location preference items. Therefore we included some of the individual items in later equations that combined the general and specific location preferences with the other explanatory variables investigated above. Final

equations are reported in Table III.3, where the first three columns present models containing the full set of the most effective predictors, and the final three columns present models containing only those variables with statistically significant or approximately significant effects.

Even the reduced equations contain several preference factors or items each, and the adjusted R^2s are .094 for the non-alumni equation and .096 for the alumni equation. The all physician equation, which contains NHSC participation as a predictor, accounts for 25.3 percent of the variance of HMSA choice. Preferences positively associated with HMSA choice in one or both subgroup equations are the specific NEED item and Community Recruitment factor, and the general URBAN and BROUGHT items. Preferences negatively associated with HMSA choice in one or both subgroup equations are the general Economic and specific Area Features factors and the general PARTNERS and HOSPITL items. The general MEDSCOL item is negatively related to HMSA choice among non-alumni and positively related to HMSA choice among NHSC alumni.

The fact that several preference items and factors have significant effects within the subsamples indicates that location preferences have an impact on location choice over and above that of NHSC participation. It is not surprising, therefore, that several variables exhibit significant effects on HMSA choice in the full sample equation, net of NHSC participation. Earlier we questioned whether some of the preferences might help to explain the strong effect of NHSC participation--either through the mechanism of selection or through the impact of NHSC participation upon particular kinds of preferences. The results suggest not. With regard to NHSC participation affecting HMSA choice by way of changes in preferences, the preference variables in the reduced equations do not diminish the coefficient of NHSC participation. When entered as the sole predictor, NHSC exhibits a coefficient of 2.836 (with an associated R^2 of .198) compared to the 2.822 recorded in Table III.3. With regard to selection, adding the NHSC indicator to an equation with the preference variables produces a very limited reduction in the estimated effects of those variables. In results not shown here, we added the NHSC variable to a model containing the general preference factors. The Professional Environment factor was fully washed out by the addition (it was not significant to begin with, so it does not appear in Table III.2), but the other factors were affected only marginally.

In summary, results of the full multivariate analysis of individual physicians' location choices between HMSAs and non-HMSAs in rural areas suggest that the factors which are positively associated with HMSA location choices are:

- NHSC service
- general or family practice specialization
- preferences to locate in a specific community with high medical need

- o preferences for an opportunity to work with a specific institution

Factors which are negatively associated with HMSA choices include:

- o preferences for particular area features of specific communities
- o preference for group practice or partnership arrangements
- o preference for having a hospital and facilities available.

Some differences are evident in Table III.3 in these results for NHSC alumni and non-alumni:

- o NHSC alumni who reported prior professional contacts in rural areas were less likely to locate in a HMSA
- o NHSC alumni who indicated their general location choice was influenced by economic factors were less likely to choose HMSA practice
- o a general/family practice specialty was not a significant variable for alumni choices between HMSA and non-HMSA practice
- o recruitment efforts by specific communities were strongly and positively associated with HMSA choices for NHSC alumni
- o a general preference to be able to have regular contact with a medical school was positively associated with NHSC alumni HMSA decisions, but negatively influenced non-alumni decisions
- o a general preference to practice in an area similar to where the physician was brought up had a positive and significant effect on HMSA location choices of NHSC alumni, but was not significant for non-alumni.

The results of the multivariate analysis of the HMSA - non-HMSA location decisions of rural primary care physicians are, in general, consistent with our prior expectations in Chapter II: 1) NHSC physicians are more likely to choose HMSA locations; 2) general and family practitioners are more

likely to choose HMSA locations; 3) preferences for collegial interactions tend to be associated with non-HMSA choices; and 4) preference for locating in a place similar to where one was reared is positively associated with (alumni's) HMSA choices. While personal and professional characteristics of physicians were only weakly associated with choices between HMSA and non-HMSA locations, inclusion of preference patterns as explanatory variables increased the ability of the model to explain HMSA-non-HMSA location choices.

E. DISCUSSION

The examination of the individual physicians' location decisions has resulted in a number of findings:

(1) There are differences in the personal and professional characteristics of NHSC alumni and non-alumni and between young M.D.s and D.O.s. However, these characteristics appear to have only weak relationships to the decision to locate in a HMSA or non-HMSA county.

(2) PPOs indicate a stronger influence of economic factors than do other physicians in choosing a location.

(3) NHSC alumni who locate in non-HMSAs and part-HMSAs express preferences which are quite different from those of alumni who locate in HMSAs.

(4) NHSC alumni report fewer prior contact events than do non-alumni. The NHSC experience as a prior contact event appears to exert a strong influence on the rural and HMSA location decision.

(5) Rural prior contact events, other than NHSC experience, do not appear to have an effect on the decision to practice in a HMSA; physicians who have been reared or educated in rural areas are no more likely to choose HMSA practice than are physicians without rural prior contacts.

(6) The multivariate analyses of individual physicians' location decisions suggest that the NHSC alumni's satisfaction with the NHSC experience does influence the decision to locate in a rural area, and that serving in the NHSC and a preference for locating in an area similar to where one grew up positively affects the alumni's decision to locate in a HMSA. In addition, NHSC alumni were strongly and positively influenced to locate in a HMSA by organized community recruitment efforts. Physicians who were particularly concerned about opportunities for group or partnership practice,

availability of hospital facilities, income potential, were less likely to choose HMSA locations. For non-alumni, a general or family practice specialty had a positive and significant effect on the decision to locate in a HMSA.

TABLE A.1

COMPARISON OF MEANS OF PERSONAL AND PROFESSIONAL CHARACTERISTICS OF PHYSICIANS, BY TYPE OF PHYSICIAN

Characteristics	All Physicians	NHSC			NON-NHSC			NHSC 1979 Alumni	
		All	MD's	PPO's	All	MD's	DO's	Urban	Rural
TOTAL NUMBER	1127.00	277.00	202.00	150.00	700.00	609.00	91.00	120.00	86.00
PERSONAL CHARACTERISTICS									
Prior Contact:									
--Percent rural birth	40.95	32.40	30.56	31.91	46.13	45.53	50.00	22.35	25.68
--Percent rural rearing	42.97	30.89	26.14	29.29	50.38	49.21	57.95	14.00	22.54
--Percent rural college	19.38	15.69	13.74	15.97	21.54	19.62	34.09	10.00	13.16
--Percent rural medical school	7.73	7.94	3.37	15.00	6.10	2.30	29.67	2.91	6.58
--Percent rural residency	3.63	4.62	4.26	5.52	2.81	1.79	9.76	1.86	6.10
--Percent spouse rural rearing	40.51	35.71	33.11	24.58	45.25	43.83	54.22	19.32	38.33
Sex:									
--Percent male	88.29	84.12	83.66	89.33	89.71	88.67	96.70	84.17	80.23
Citizenship:									
--Percent foreign born	1.24	0.72	0.50	0.00	1.71	1.97	0.00	.83	1.16
Race:									
--Percent non-white	4.89	13.77	15.92	4.67	1.43	1.48	1.10	19.49	17.44
Marital Status:									
--Percent married	90.31	88.09	87.13	84.56	92.42	92.43	92.31	86.67	87.21
--Percent spouse college degree	76.90	76.45	79.31	73.81	77.67	78.97	69.05	83.50	78.67
--Percent spouse employed	55.30	63.90	62.43	51.61	52.80	51.79	59.52	61.17	63.51
PROFESSIONAL CHARACTERISTICS									
Specialty:									
--Percent in General Practice	19.79	28.16	25.74	34.00	13.43	6.40	60.44	14.41	30.23
--Percent in Family Practice	51.55	44.77	45.54	42.67	56.14	60.43	27.47	39.98	44.19
--Percent in Internal Medicine	18.01	15.16	15.35	12.67	20.29	22.50	5.49	17.80	10.47
--Percent in Pediatrics	8.52	7.94	8.42	8.00	8.86	10.02	1.10	5.08	9.30
--Percent in other specialties	1.06	1.81	2.48	2.67	0.43	0.16	2.20	21.19	2.33
Board Certification:									
--Percent board certified	67.62	59.64	60.00	47.33	75.14	83.99	15.56	52.50	51.16
--Percent board eligible	12.40	13.09	11.00	16.00	11.35	6.93	41.11	32.50	15.12
--Percent not board certified	19.98	27.27	29.00	36.67	13.51	9.08	43.33	15.00	33.72

TABLE A.2
COMPARISON OF MEANS OF PERSONAL AND PROFESSIONAL CHARACTERISTICS OF NHSC AND NON-NHSC PHYSICIANS, BY LOCATION OF PRACTICE

Characteristics	Whole HMSA Location		Part HMSA Location		Non-HMSA Location	
	NHSC ALUMNI	Non-NHSC PHYSICIANS	NHSC ALUMNI	Non-NHSC PHYSICIANS	NHSC ALUMNI	Non-NHSC PHYSICIANS
TOTAL NUMBER	116.00	118.00	105.00	222.00	56.00	360.00
PERSONAL CHARACTERISTICS						
Prior Contact:						
--Percent rural birth	32.71	49.52	26.88	41.04	42.00	48.25
--Percent rural rearing	35.29	53.21	26.32	42.51	30.61	54.23
--Percent rural college	19.23	22.73	9.09	20.38	21.15	21.87
--Percent rural medical school	6.86	6.48	8.16	5.16	9.62	6.57
--Percent rural residency	2.80	2.02	5.05	3.30	7.41	2.73
--Percent spouse rural rearing	39.76	43.16	32.14	44.92	34.88	46.04
Sex:						
--Percent male	80.17	89.83	86.67	88.74	87.50	90.28
Citizenship:						
--Percent foreign born	0.86	4.24	0.00	0.90	1.79	1.39
Race:						
--Percent non-white	20.69	0.85	7.69	0.00	10.71	2.50
Marital Status:						
--Percent married	86.21	88.89	91.43	89.64	85.71	95.28
--Percent spouse college degree	74.00	73.79	80.00	79.90	74.47	77.55
--Percent spouse employed	64.65	55.34	64.21	50.51	61.70	53.35
PROFESSIONAL CHARACTERISTICS						
Specialty:						
--Percent in General Practice	34.48	16.95	23.81	12.61	23.21	12.78
--Percent in Family Practice	42.24	63.56	50.48	53.60	39.29	55.28
--Percent in Internal Medicine	12.93	12.71	17.14	26.13	16.07	19.17
--Percent in Pediatrics	10.34	4.24	6.67	6.76	5.36	11.67
--Percent in other specialties	0.00	0.85	0.95	0.45	7.14	0.28
Board Certificaton:						
--Percent board certified	51.30	61.02	70.19	79.19	57.14	77.31
--Percent board eligible	15.65	16.10	7.69	9.50	17.86	10.92
--Percent not board certified	33.04	22.88	22.12	11.31	25.00	11.76

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TABLE A.3

COMPARISON OF MEANS OF PERSONAL AND PROFESSIONAL CHARACTERISICS OF NON-NHSC PHYSICIANS, BY TYPE AND LOCATION, AND NHSC PHYSICIANS, BY LOCATION

	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
Characteristics	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
PERSONAL CHARACTERISTICS												
Prior Contact:												
--Percent rural birth	48.25	49.52	41.04	47.44	48.86	41.05	53.06	52.94	40.91	42.00	32.71	26.88
--Percent rural rearing	54.23	53.21	42.51	52.72	53.26	41.62	63.27	52.94	50.00	30.61	35.29	26.32
--Percent rural college	21.87	22.73	20.38	20.21	17.02	20.00	31.37	56.25	23.81	21.15	19.23	9.09
--Percent rural medical school	6.57	6.48	5.16	2.11	1.10	3.16	31.37	35.29	21.74	9.62	6.86	8.16
--Percent rural residency	2.73	2.02	3.30	1.75	1.19	2.12	9.09	6.67	13.04	7.41	2.80	5.05
--Percent spouse rural rearing	46.04	43.16	44.92	44.64	41.77	43.45	54.17	50.00	57.89	34.88	39.76	32.14
Sex:												
--Percent male	90.28	89.83	88.74	89.00	88.12	88.44	98.04	100.00	91.30	87.50	80.17	86.67
Citizenship:												
--Percent foreign born	1.39	4.24	0.90	1.62	4.95	1.01	0.00	0.00	0.00	1.79	0.86	0.00
Race:												
--Percent non-white	2.50	0.85	0.00	2.59	0.99	0.00	1.96	0.00	0.00	10.71	20.69	7.69
Marital Status:												
--Percent married	95.28	88.89	89.64	95.15	88.00	90.45	96.08	94.12	82.61	85.71	86.21	91.43
--Percent spouse college degree	77.55	73.79	79.90	79.93	73.56	80.00	63.27	75.00	78.95	74.47	74.00	80.00
--Percent spouse employed	53.35	55.34	50.51	51.36	56.32	50.28	65.31	50.00	52.63	61.70	64.65	64.21
PROFESSIONAL CHARACTERISTICS												
Specialty:												
--Percent in General Practice	12.78	16.95	12.61	4.53	9.90	7.54	62.75	58.82	56.52	23.21	34.48	23.81
--Percent in Family Practice	55.28	63.56	53.60	59.87	68.32	57.29	27.45	35.29	21.74	39.29	42.24	50.48
--Percent in Internal Medicine	19.17	12.71	26.13	21.36	14.85	28.14	5.88	0.00	8.70	16.07	12.93	17.14
--Percent in Pediatrics	11.67	4.24	6.76	13.59	4.95	7.04	0.00	0.00	4.35	5.36	10.34	6.67
--Percent in other specialties	0.28	0.85	0.45	0.32	0.00	0.00	0.00	5.88	4.35	7.14	0.00	0.95
Board Certification:												
--Percent board certified	77.31	61.02	79.19	87.30	70.30	85.86	16.00	5.88	21.74	57.14	51.30	70.19
--Percent board eligible	10.92	16.10	9.50	5.21	12.87	6.57	46.00	35.29	34.78	17.86	15.65	7.69
--Percent not board certified	11.76	22.88	11.31	7.49	16.83	7.58	38.00	58.82	43.48	25.00	33.04	22.12

TABLE A.4
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS INFLUENTIAL IN DETERMINING GENERAL LOCATION DECISIONS, BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	44.67	46.15	35.83	51.07	35.42	49.65	47.25
b. Climate or geographic features of area	78.30	72.00	83.89	78.38	81.92	65.73	79.48
c. Having been brought up in such a community	38.25	36.31	37.22	40.62	33.21	27.97	42.34
d. Payment of "forgiveness loan"	18.90	26.46	15.83	15.68	29.89	30.07	12.28
e. Influence of wife or husband (her/his desires, career, etc.)	50.00	43.08	53.33	52.49	58.30	44.06	47.98
f. Influence of family or friends	25.95	23.69	23.89	29.45	28.78	16.78	26.73
g. High medical need in area	58.86	67.38	57.22	53.68	69.74	61.54	54.05
h. Influence of preceptorship program	13.56	12.62	15.00	13.06	14.76	6.99	14.45
I. Having gone through medical school or internship in area	18.35	19.38	18.06	17.81	23.25	16.08	16.91
J. Advice of older physician	6.96	5.54	5.83	9.03	4.43	4.90	8.38
k. Organized efforts of community to recruit physicians	30.83	38.77	26.94	28.03	38.38	38.46	26.30
l. Opportunities for social life	23.78	22.46	25.83	23.04	28.04	20.98	22.69
m. Recreational and sports facilities	52.35	44.92	59.17	52.26	51.66	47.55	53.61
n. Quality of educational system for children	44.48	34.77	47.78	49.17	43.91	34.27	46.82
o. Prospect of being more influential in community affairs	19.08	20.62	18.89	18.05	23.25	19.58	17.34
p. Cultural advantages	16.82	13.23	18.33	18.29	17.71	13.99	17.05
q. Prosperity of community	24.68	21.85	23.06	28.27	22.88	25.87	25.14
r. Preference for urban or rural living	76.85	69.54	82.78	77.43	76.38	55.94	81.36
s. Availability of hospital facilities and personnel	63.65	56.31	64.17	68.88	65.31	53.15	65.17
t. Availability of good social service, welfare, or home care services	11.75	11.08	13.33	10.93	21.03	9.09	8.67
u. Opportunities for regular contact with a medical school or medical center	18.08	18.15	18.06	18.05	26.20	16.78	15.17
v. Opportunity for regular contact with other physicians	44.39	38.77	47.50	46.08	54.98	32.87	42.63
w. Opportunity to join desirable partnership or group practice	39.96	26.15	40.28	50.36	31.73	23.78	46.53
x. Availability of loans for beginning practice	13.02	14.15	10.28	14.49	14.76	9.79	13.01
y. Opportunity to work with specific institution	4.16	5.54	5.00	2.38	8.86	3.50	2.46
z. Access to continuing medical education	18.81	19.69	17.50	19.24	29.52	20.28	14.31

TABLE A.5
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS INFLUENTIAL IN DETERMINING SPECIFIC LOCATION DECISIONS, BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	35.11	39.01	28.10	38.15	30.88	48.94	33.96
b. Climate or geographic features of area	55.96	54.18	61.71	52.37	65.81	48.23	53.67
c. Having been brought up in such a community	29.96	29.10	26.72	33.41	27.57	21.99	32.52
d. Payment of "forgiveness loan"	15.52	22.29	14.88	10.90	27.57	23.40	9.21
e. Influence of wife or husband (her/his desires, career, etc.)	42.24	37.77	44.90	43.36	52.57	33.33	40.00
f. Influence of family or friends	22.20	22.60	19.28	24.41	23.16	15.60	23.17
g. High medical need in area	51.35	61.92	51.52	43.13	60.29	51.77	47.77
h. Influence of preceptorship program	9.39	7.74	10.19	9.95	11.76	4.96	9.35
I. Having gone through medical school or internship in area	13.99	14.55	15.43	12.32	18.75	16.31	11.65
J. Advice of older physician	7.67	8.05	4.41	10.19	7.72	5.67	8.06
k. Organized efforts of community to recruit physicians	31.68	38.70	30.03	27.73	37.50	38.30	28.06
l. Opportunities for social life	13.63	13.31	14.88	12.80	20.96	11.35	11.22
m. Recreational and sports facilities	38.99	33.13	44.35	38.86	43.75	34.04	38.13
n. Quality of educational system for children	36.37	25.70	40.22	41.23	38.60	27.66	37.27
o. Prospect of being more influential in community affairs	16.61	18.58	17.08	14.69	22.79	16.31	14.24
p. Cultural advantages	10.74	9.91	11.29	10.90	18.01	4.26	9.21
q. Prosperity of community	18.95	13.93	18.46	23.22	18.38	17.02	19.57
r. Preference for urban or rural living	58.94	53.25	63.64	59.24	63.97	46.10	59.57
s. Availability of hospital facilities and personnel	53.34	49.23	54.82	55.21	59.19	46.81	52.37
t. Availability of good social service, welfare, or home care services	8.75	8.98	9.37	8.06	18.75	7.09	5.18
u. Opportunities for regular contact with a medical school or medical center	12.18	14.86	11.85	10.43	23.90	11.35	7.77
v. Opportunity for regular contact with other physicians	33.75	30.03	37.74	33.18	44.85	25.53	31.08
w. Opportunity to join desirable partnership or group practice	40.07	27.24	43.53	46.92	28.68	26.95	47.19
x. Availability of loans for beginning practice	11.55	13.00	9.37	12.32	11.03	9.22	12.23
y. Opportunity to work with specific institution	6.50	5.57	9.64	4.50	12.87	6.38	4.03
z. Access to continuing medical education	11.37	12.07	12.67	9.72	22.06	9.93	7.88

TABLE A.6
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS INFLUENTIAL
IN DETERMINING GENERAL LOCATION DECISIONS, FOR NON-NHSC PHYSICIANS,
BY TYPE AND LOCATION CHOICE, AND FOR NHSC PHYSICIANS, BY LOCATION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	51.54	52.54	37.33	48.69	51.49	35.38	68.63	58.82	54.55	47.27	30.97	33.98
b. Climate or geographic features of area	77.31	73.73	86.18	79.08	74.26	88.72	66.67	70.59	63.64	87.27	76.11	85.44
c. Having been brought up in such a community	42.58	44.92	40.55	41.18	47.52	41.03	50.98	29.41	36.36	27.27	37.17	32.04
d. Payment of "forgiveness loan"	13.45	16.10	8.29	13.07	15.84	8.21	15.69	17.65	9.09	27.27	34.51	26.21
e. Influence of wife or husband (her/his desires, career, etc.)	50.42	55.59	50.69	52.29	54.65	53.85	39.22	41.18	22.73	67.27	52.21	60.19
f. Influence of family or friends	28.57	27.97	23.04	27.78	25.74	22.05	33.33	41.18	31.82	36.36	26.55	27.18
g. High medical need in area	50.14	65.25	54.38	48.69	68.32	52.82	58.82	47.06	68.18	70.91	76.99	61.17
h. Influence of preceptorship	14.29	14.41	14.75	13.07	13.86	12.31	21.57	17.65	36.36	7.27	17.70	15.33
i. Having gone through medical school	17.65	16.10	16.13	17.65	16.83	15.38	17.65	11.76	22.73	18.18	27.43	21.36
j. Advice of older physician	9.52	6.78	7.37	7.19	3.96	6.67	23.53	23.53	13.64	5.45	5.31	2.91
k. Organized efforts of community to recruit physicians	27.45	31.36	21.66	26.80	31.68	19.49	31.37	29.41	40.91	32.73	44.25	34.95
l. Opportunities for social life	22.41	19.49	24.88	21.90	17.82	25.13	25.49	29.41	22.73	27.27	26.55	30.10
m. Recreational and sports facilities	51.54	46.61	60.83	50.33	43.56	63.08	58.82	64.71	40.91	56.36	41.59	60.19
n. Quality of educational system for children	48.74	39.83	47.47	48.04	39.60	45.64	52.94	41.18	63.64	50.91	33.63	51.46
o. Prospect of being more influential in community affairs	17.93	17.80	16.13	16.01	19.80	16.92	29.41	5.88	9.09	16.36	25.66	24.27
p. Cultural advantages	17.37	11.02	19.82	18.30	11.88	20.00	11.76	5.88	18.18	21.82	15.93	17.48
q. Prosperity of community	27.45	22.03	23.04	27.45	21.78	22.56	27.45	23.53	27.27	32.73	15.93	25.24
r. Preference for urban or rural living	77.87	84.75	85.25	78.43	87.13	86.15	74.51	70.59	77.27	76.36	68.14	85.44
s. Availability of hospital	70.87	50.85	63.59	71.24	49.50	63.59	68.63	58.82	63.64	61.82	64.60	67.96
t. Availability of good social service, welfare, or home care services	9.24	5.08	9.68	10.13	2.97	9.23	3.92	17.65	13.64	21.82	22.12	19.42
u. Opportunities for regular contact with a medical school or medical center	18.21	8.47	13.82	16.67	9.90	13.85	27.45	0.00	13.64	16.36	29.20	28.16
v. Opportunity for regular contact with other physicians	45.66	32.20	43.32	45.75	27.72	43.59	45.10	58.52	40.91	52.73	51.33	60.19
w. Opportunity to join desirable partnership or group practice	52.38	31.36	45.16	54.58	30.69	44.62	39.22	35.29	50.00	38.18	25.66	34.95
x. Availability of loans for beginning practice	14.85	12.71	10.14	12.42	12.87	7.69	29.41	11.76	31.82	12.73	19.47	10.68
y. Opportunity to work with specific institution	1.96	3.39	2.76	1.31	1.98	2.05	5.88	11.76	9.09	5.45	9.73	9.71
z. Access to continuing medical education	16.53	12.71	11.52	16.34	13.86	12.82	17.65	5.88	0.00	34.55	27.43	29.13

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TABLE A.7
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS INFLUENTIAL
IN DETERMINING SPECIFIC LOCATION DECISIONS, FOR NON-NHSC PHYSICIANS,
BY TYPE AND LOCATION CHOICE, AND FOR NHSC PHYSICIANS, BY LOCATION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	36.87	33.33	29.55	34.85	31.00	28.93	49.02	47.06	34.78	40.00	31.58	25.24
b. Climate or geographic features of area	50.00	52.99	60.00	51.79	56.00	61.93	39.22	35.29	43.48	67.27	59.65	71.84
c. Having been brought up in such a community	34.08	35.90	28.18	33.88	37.00	29.44	35.29	29.41	17.39	29.09	30.70	23.30
d. Payment of "forgiveness loan"	9.50	14.53	5.91	10.10	15.00	5.58	5.88	11.76	8.70	20.00	29.82	29.13
e. Influence of wife or husband (her/his desires, career, etc.)	41.06	34.19	41.36	41.69	33.00	43.65	37.25	41.18	21.74	58.18	47.37	55.34
f. Influence of family or friends	23.18	30.77	19.09	24.43	23.00	19.29	15.69	23.53	17.39	32.73	21.93	19.42
g. High medical need in area	41.34	63.25	50.00	39.74	65.00	48.73	50.98	52.94	60.87	50.91	69.30	55.34
h. Influence of preceptorship program	10.06	6.84	9.55	8.79	8.00	8.63	17.65	0.00	17.39	9.09	12.28	12.62
i. Having gone through medical school	11.73	11.11	11.82	11.40	10.00	12.18	13.73	17.65	8.70	14.55	19.30	20.39
j. Advice of older physician	10.06	8.55	4.55	7.49	8.00	4.57	25.49	11.76	4.35	10.91	8.77	4.85
k. Organized efforts of community to recruit physicians	27.93	33.33	25.45	27.04	34.00	25.38	33.33	29.41	26.09	29.09	44.74	33.98
l. Opportunities for social life	10.89	10.26	12.27	10.75	11.00	13.20	11.76	5.88	4.35	21.82	17.54	24.27
m. Recreational and sports facilities	37.15	30.77	43.64	37.13	30.00	46.19	37.25	35.29	21.74	50.91	34.21	50.49
n. Quality of educational system for children	39.94	27.35	38.18	37.79	26.00	40.10	52.94	35.29	21.74	47.27	27.19	46.60
o. Prospect of being more influential in community affairs	13.41	17.09	14.09	12.05	20.00	15.23	21.57	0.00	4.35	18.18	24.56	23.30
p. Cultural advantages	8.66	6.84	11.36	9.45	8.00	12.18	3.92	0.00	4.35	23.64	17.54	15.53
q. Prosperity of community	22.07	11.11	20.00	23.13	12.00	20.30	15.69	5.88	17.39	27.27	11.40	21.36
r. Preference for urban or rural living	57.82	58.97	67.73	58.03	60.00	62.94	68.63	52.94	60.87	69.09	56.14	69.90
s. Availability of hospital facilities and personnel	54.19	41.03	55.45	53.75	42.00	55.33	56.86	35.29	56.52	60.00	60.53	57.28
t. Availability of good social service, welfare, or home care services	5.87	3.42	5.00	6.51	4.00	5.58	1.96	0.00	0.00	20.00	18.42	18.45
u. Opportunities for regular contact with a medical school or medical center	8.66	5.98	7.27	8.47	7.00	6.60	9.80	0.00	13.04	20.00	26.32	23.30
v. Opportunity for regular contact with other physicians	31.84	23.08	34.09	32.57	21.00	33.50	27.45	35.29	39.13	43.64	41.23	49.51
w. Opportunity to join desirable partnership or group practice	49.16	33.33	51.36	52.77	34.00	51.78	27.45	29.41	47.83	32.73	24.56	31.07
x. Availability of loans for beginning practice	12.85	11.11	11.82	11.40	11.00	10.66	21.57	11.76	21.74	10.91	15.79	5.83
y. Opportunity to work with specific institution	3.91	1.71	5.45	3.58	1.00	5.58	5.88	5.88	4.35	9.09	11.40	16.50
z. Access to continuing medical education	7.26	5.98	8.64	7.82	7.00	9.14	3.92	0.00	4.35	21.82	21.93	22.33

TABLE A.8
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS IMPORTANT* IN DETERMINING GENERAL LOCATION DECISIONS, BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	16.95	21.45	11.35	18.31	14.80	25.33	16.00
b. Climate or geographic features of area	41.44	34.74	47.84	41.08	45.85	24.00	43.43
c. Having been brought up in such a community	16.77	16.92	14.05	19.01	11.91	9.33	20.29
d. Payment of "forgiveness loan"	8.70	11.18	8.38	7.04	10.47	19.33	5.71
e. Influence of wife or husband (her/his desires, career, etc.)	23.78	22.66	26.22	22.54	26.35	19.33	23.71
f. Influence of family or friends	10.03	10.27	9.19	10.56	10.11	6.67	10.71
g. High medical need in area	30.43	38.67	28.11	26.06	37.91	31.33	27.29
h. Influence of preceptorship program	1.95	1.81	1.35	2.58	2.17	0.67	2.14
I. Having gone through medical school or internship in area	3.99	3.63	3.78	4.46	4.33	6.00	3.43
J. Advice of older physician	0.62	0.91	0.27	0.70	0.36	1.33	0.57
k. Organized efforts of community to recruit physicians	8.43	12.08	6.49	7.28	9.03	14.00	7.00
l. Opportunities for social life	1.77	2.42	1.35	1.64	2.17	1.33	1.71
m. Recreational and sports facilities	14.02	11.18	16.22	14.32	12.64	9.33	15.57
n. Quality of educational system for children	9.14	6.95	8.38	11.50	7.58	6.67	10.29
o. Prospect of being more influential in community affairs	1.69	2.11	1.89	1.17	3.25	0.67	1.29
p. Cultural advantages	2.22	1.51	2.43	2.58	2.17	1.33	2.43
q. Prosperity of community	2.84	3.02	2.43	3.05	3.97	2.00	2.57
r. Preference for urban or rural living	39.40	30.51	43.51	42.72	35.74	23.33	44.29
s. Availability of hospital facilities and personnel	18.46	16.31	20.54	18.31	18.41	17.33	18.71
t. Availability of good social service, welfare, or home care services	0.35	0.30	0.54	0.23	0.00	1.33	0.29
u. Opportunities for regular contact with a medical school or medical center	1.60	2.11	1.62	1.17	2.89	1.33	1.14
v. Opportunity for regular contact with other physicians	6.12	5.14	7.30	5.87	7.94	6.00	5.43
w. Opportunity to join desirable partnership or group practice	20.67	12.99	18.92	28.17	10.83	8.00	27.29
x. Availability of loans for beginning practice	1.77	3.02	1.08	1.41	1.44	0.67	2.14
y. Opportunity to work with specific institution	1.51	2.11	2.16	0.47	3.25	1.33	0.86
z. Access to continuing medical education	0.80	0.91	0.81	0.70	2.17	0.67	0.29

* Ranked as one of three most influential factors in location decision.

TABLE A.9
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS IMPORTANT* IN DETERMINING SPECIFIC LOCATION DECISIONS, BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	17.21	20.24	13.51	18.08	14.44	24.67	16.71
b. Climate or geographic features of area	30.61	25.38	35.95	30.05	40.43	19.33	29.14
c. Having been brought up in such a community	15.53	15.71	12.70	17.84	11.19	9.33	18.57
d. Payment of "forgiveness loan"	8.07	10.57	7.57	6.57	9.39	17.33	5.57
e. Influence of wife or husband (her/his desires, career, etc.)	24.67	23.87	24.32	25.59	25.63	17.33	25.86
f. Influence of family or friends	12.87	13.29	10.81	14.32	11.19	10.00	14.14
g. High medical need in area	28.39	37.76	26.22	23.00	35.02	25.33	26.43
h. Influence of preceptorship program	2.04	1.51	1.62	2.82	1.44	0.67	2.57
I. Having gone through medical school or internship in area	4.08	3.63	4.59	3.99	5.05	6.67	3.14
J. Advice of older physician	1.69	0.60	1.62	2.58	1.81	0.67	1.86
k. Organized efforts of community to recruit physicians	12.78	17.82	11.35	10.09	13.36	16.67	11.71
l. Opportunities for social life	1.60	1.81	0.81	2.11	2.17	0.00	1.71
m. Recreational and sports facilities	12.60	8.46	14.59	14.08	11.55	7.33	14.14
n. Quality of educational system for children	10.65	6.95	9.73	14.32	10.83	8.67	11.00
o. Prospect of being more influential in community affairs	2.04	2.42	2.43	1.41	3.61	0.67	1.71
p. Cultural advantages	2.40	1.51	2.97	2.58	3.25	0.67	2.43
q. Prosperity of community	3.02	3.02	2.43	3.52	3.97	2.67	2.71
r. Preference for urban or rural living	28.31	20.24	33.51	30.05	28.88	16.00	30.71
s. Availability of hospital facilities and personnel	20.50	17.52	22.70	20.89	21.30	18.00	20.71
t. Availability of good social service, welfare, or home care services	0.18	0.60	0.00	0.00	0.00	0.67	0.14
u. Opportunities for regular contact with a medical school or medical center	1.51	2.42	1.08	1.17	1.81	1.33	1.43
v. Opportunity for regular contact with other physicians	7.54	6.95	8.11	7.51	8.30	7.33	7.29
w. Opportunity to join desirable partnership or group practice	27.15	17.82	27.84	33.80	13.72	12.00	35.71
x. Availability of loans for beginning practice	2.75	3.93	1.89	2.58	0.72	2.00	3.71
y. Opportunity to work with specific institution	2.48	2.42	4.05	1.17	3.97	2.00	2.00
z. Access to continuing medical education	0.80	0.91	0.54	0.94	1.81	1.33	0.29

*Ranked as one of three most influential factors in the location decision.

TABLE A.10
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS IMPORTANT*
IN DETERMINING GENERAL LOCATION DECISIONS, FOR NON-NHSC PHYSICIANS,
BY TYPE AND LOCATION CHOICE, AND FOR NHSC PHYSICIANS, BY LOCATION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	16.39	22.03	12.16	13.92	18.81	11.06	31.37	41.18	21.74	25.00	13.79	10.48
b. Climate or geographic features of area	39.17	38.14	53.15	41.10	35.64	56.28	27.45	52.94	26.09	55.36	41.38	45.71
c. Having been brought up in such a community	20.83	27.97	15.32	20.39	28.71	15.58	23.53	23.53	13.04	8.93	11.21	14.29
d. Payment of "forgiveness loan"	6.67	5.93	4.05	6.80	6.93	4.02	5.88	0.00	4.35	5.36	12.93	10.48
e. Influence of wife or husband (her/his desires, career, etc.)	21.94	24.58	26.13	22.33	24.75	27.64	19.61	23.53	13.04	28.57	24.14	27.62
f. Influence of family or friends	10.28	16.10	8.56	11.33	15.84	8.04	3.92	17.65	13.04	14.29	8.62	9.52
g. High medical need in area	25.28	33.05	27.48	24.60	35.64	26.63	29.41	17.65	34.78	26.79	49.14	31.43
h. Influence of preceptorship program	2.78	1.69	1.35	2.91	1.98	1.51	1.96	0.00	0.00	1.79	3.45	0.95
i. Having gone through medical school	4.44	1.69	2.70	5.18	1.98	2.51	0.00	0.00	4.35	3.57	5.17	3.81
j. Advice of older physician	0.56	1.69	0.00	0.65	0.99	0.00	0.00	5.88	0.00	1.79	0.00	0.00
k. Organized efforts of community to recruit physicians	7.22	11.02	4.50	6.15	10.89	4.02	13.73	11.76	8.70	7.14	11.21	7.62
l. Opportunities for social life	1.67	3.39	0.90	1.29	2.97	1.01	3.92	5.88	0.00	1.79	1.72	2.86
m. Recreational and sports facilities	14.44	16.10	17.12	14.56	14.85	17.09	13.73	23.53	17.39	14.29	10.34	14.29
n. Quality of educational system for children	11.94	11.02	7.21	9.39	10.89	6.53	27.45	11.76	13.04	10.71	4.31	9.52
o. Prospect of being more influential in community affairs	1.11	2.54	0.90	1.29	2.97	1.01	0.00	0.00	0.00	0.00	3.45	4.76
p. Cultural advantages	2.22	1.69	3.15	2.59	1.98	3.52	0.00	0.00	0.00	3.57	1.72	1.90
q. Prosperity of community	2.78	1.69	2.70	32.24	1.98	2.51	0.00	0.00	4.35	3.57	5.17	2.86
r. Preference for urban or rural living	44.72	36.44	47.75	43.69	39.60	47.74	50.98	17.65	47.83	32.14	31.90	41.90
s. Availability of hospital facilities and personnel	18.89	11.86	22.07	20.06	12.87	20.60	11.76	5.88	34.78	17.86	17.24	20.00
t. Availability of good social service, welfare, or home care services	0.00	0.00	0.90	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00
u. Opportunities for regular contact with a medical school or medical center	1.39	0.00	1.35	1.29	0.00	1.51	1.96	0.00	0.00	0.00	4.31	2.86
v. Opportunity for regular contact with other physicians	5.83	1.69	6.76	6.47	0.99	7.04	1.96	5.88	4.35	7.14	7.76	8.57
w. Opportunity to join desirable partnership or group practice	30.83	19.49	25.68	32.69	19.80	25.13	19.61	17.65	30.48	16.07	10.34	8.57
x. Availability of loans for beginning practice	1.67	4.24	1.80	0.65	2.97	1.51	7.84	11.76	4.35	0.00	3.45	0.00
y. Opportunity to work with specific institution	0.28	0.85	1.80	0.32	0.00	1.51	0.00	5.88	4.35	1.79	4.31	2.86
z. Access to continuing medical education	0.28	0.00	0.45	0.32	0.00	0.50	0.00	0.00	0.00	1.79	2.59	1.90

*Ranked as one of three most influential factors in location decision.

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TABLE A.11
FREQUENCY OF RESPONSE INDICATING THAT A FACTOR IS IMPORTANT*
IN DETERMINING SPECIFIC LOCATION DECISIONS, FOR NON-NHSC PHYSICIANS,
BY TYPE AND LOCATION CHOICE, AND FOR NHSC PHYSICIANS, BY LOCATION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	16.67	19.49	15.32	14.89	16.83	14.57	27.45	35.29	21.74	21.43	13.79	11.43
b. Climate or geographic features of area	26.67	26.27	34.68	26.54	24.75	36.18	27.45	35.29	21.74	51.79	32.76	42.86
c. Having been brought up in such a community	18.89	26.27	13.69	19.09	27.72	14.57	17.65	17.65	8.70	10.71	11.21	11.43
d. Payment of "forgiveness loan"	6.67	5.93	3.60	7.44	6.93	3.52	1.96	0.00	4.35	5.36	11.21	9.52
e. Influence of wife or husband (her/his desires, career, etc.)	26.94	26.27	23.87	27.83	25.74	24.62	21.57	29.41	17.39	21.43	26.72	26.67
f. Influence of family or friends	14.44	18.64	11.26	15.86	17.82	11.06	5.88	23.53	13.04	14.29	12.93	7.62
g. High medical need in area	22.50	36.44	27.48	22.33	36.63	26.13	23.53	35.29	39.13	25.00	46.55	27.62
h. Influence of preceptorship program	3.06	2.54	1.80	3.24	2.97	2.01	1.96	0.00	0.00	1.79	1.72	0.95
i. Having gone through medical school	4.17	1.69	2.25	4.53	0.99	2.01	1.96	5.88	4.35	1.79	5.17	6.67
j. Advice of older physician	2.22	1.69	1.35	1.62	0.99	1.01	5.88	5.88	4.35	5.36	0.00	1.90
k. Organized efforts of community to recruit physicians	10.83	18.64	9.46	11.00	18.81	8.54	9.80	17.65	17.39	7.14	17.24	12.38
l. Opportunities for social life	2.22	2.54	0.45	1.94	2.97	0.50	3.92	0.00	0.00	1.79	2.59	1.90
m. Recreational and sports facilities	14.17	12.71	14.86	13.59	12.87	14.07	17.65	11.76	21.74	14.29	6.90	15.24
n. Quality of educational system for children	14.44	6.78	7.66	11.65	7.92	7.04	31.37	0.00	13.04	14.29	6.90	13.33
o. Prospect of being more influential in community affairs	1.39	2.54	1.80	1.62	2.97	2.01	0.00	0.00	0.00	1.79	3.45	4.76
p. Cultural advantages	2.50	0.85	3.15	2.91	0.99	3.52	0.00	0.00	0.00	1.79	3.45	3.81
q. Prosperity of community	3.33	0.85	2.70	3.88	0.99	2.51	0.00	0.00	4.35	3.57	5.17	2.86
r. Preference for urban or rural living	30.56	24.58	34.23	28.48	26.73	34.67	43.14	11.76	30.43	28.57	22.41	36.91
s. Availability of hospital facilities and personnel	20.00	13.56	25.68	20.06	13.86	25.13	19.61	11.76	30.43	25.00	19.83	20.95
t. Availability of good social service, welfare, or home care services	0.00	0.85	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u. Opportunities for regular contact with a medical school or medical center	1.39	1.69	1.35	1.29	0.99	1.51	1.96	5.88	0.00	0.00	3.45	0.95
v. Opportunity for regular contact with other physicians	7.22	4.24	9.01	7.77	3.96	9.05	3.92	5.88	8.70	10.71	7.76	7.62
w. Opportunity to join desirable partnership or group practice	37.22	26.27	38.29	39.81	25.74	39.20	21.57	29.41	30.43	17.86	14.66	10.48
x. Availability of loans for beginning practice	3.06	6.78	3.15	2.27	5.94	3.02	7.84	11.76	4.35	0.00	1.72	0.00
y. Opportunity to work with specific institution	1.39	1.69	3.15	0.97	0.99	3.02	3.92	5.88	4.35	0.00	4.31	5.71
z. Access to continuing medical education	0.28	0.00	0.45	0.32	0.00	0.50	0.00	0.00	0.00	1.79	2.59	0.95

*Ranked as one of three most influential factors in the location decision.

TABLE A.12
RANKING OF GENERAL FACTORS BY IMPORTANCE SCORE*
BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	0.50	0.70	0.31	0.51	0.49	0.81	0.44
b. Climate or geographic features of area	1.43	1.16	1.68	1.42	1.50	0.89	1.52
c. Having been brought up in such a community	0.58	0.59	0.51	0.63	0.39	0.36	0.69
d. Payment of "forgiveness loan"	0.27	0.37	0.22	0.23	0.34	0.58	0.17
e. Influence of wife or husband (her/his desires, career, etc.)	0.79	0.76	0.89	0.73	0.88	0.73	0.77
f. Influence of family or friends	0.32	0.33	0.30	0.34	0.30	0.20	0.36
g. High medical need in area	0.92	1.20	0.86	0.75	1.32	0.86	0.78
h. Influence of preceptorship program	0.05	0.02	0.04	0.09	0.03	0.03	0.07
I. Having gone through medical school or internship in area	0.10	0.11	0.09	0.11	0.12	0.18	0.08
J. Advice of older physician	0.02	0.03	0.01	0.02	0.00	0.04	0.02
k. Organized efforts of community to recruit physicians	0.22	0.30	0.18	0.19	0.26	0.35	0.18
l. Opportunities for social life	0.04	0.05	0.02	0.04	0.04	0.01	0.05
m. Recreational and sports facilities	0.33	0.27	0.37	0.34	0.33	0.20	0.36
n. Quality of educational system for children	0.21	0.12	0.20	0.29	0.18	0.12	0.24
o. Prospect of being more influential in community affairs	0.03	0.04	0.04	0.03	0.07	0.02	0.02
p. Cultural advantages	0.07	0.04	0.07	0.09	0.05	0.04	0.08
q. Prosperity of community	0.06	0.07	0.05	0.07	0.06	0.05	0.07
r. Preference for urban or rural living	1.22	0.91	1.41	1.30	1.14	0.71	1.36
s. Availability of hospital facilities and personnel	0.45	0.43	0.48	0.43	0.38	0.44	0.47
t. Availability of good social service welfare, or home care services	0.01	0.00	0.02	0.01	0.00	0.03	0.01
u. Opportunities for regular contact with a medical school or medical center	0.04	0.05	0.04	0.03	0.06	0.05	0.03
v. Opportunity for regular contact with other physicians	0.15	0.14	0.15	0.16	0.21	0.17	0.13
w. Opportunity to join desirable partnership or group practice	0.69	0.38	0.64	0.97	0.35	0.27	0.91
x. Availability of loans for beginning practice	0.04	0.08	0.01	0.02	0.04	0.03	0.04
y. Opportunity to work with specific institution	0.05	0.08	0.05	0.01	0.10	0.03	0.03
z. Access to continuing medical education	0.02	0.03	0.01	0.01	0.05	0.01	0.00

* The "importance" score is calculated by assigning factor points as follows:
Most important = 5
Second importance = 3
Third importance = 1

TABLE A.13
RANKING OF SPECIFIC FACTORS BY IMPORTANCE SCORE*
BY LOCATION CHOICE AND PHYSICIAN CATEGORY

Characteristics	All	LOCATION			PHYSICIAN CATEGORY		
		HMSA Location	Part-HMSA Location	Non-HMSA Location	NHSC Alumni	Current PPO's	Non-NHSC Physicians
TOTAL NUMBER	1127.00	331.00	370.00	426.00	277.00	150.00	700.00
a. Income potential	0.51	0.49	0.47	0.55	0.40	0.59	0.53
b. Climate or geographic features of area	0.81	0.71	0.92	0.79	1.10	0.45	0.77
c. Having been brought up in such a community	0.42	0.44	0.31	0.51	0.35	0.24	0.49
d. Payment of "forgiveness loan"	0.23	0.31	0.23	0.17	0.25	0.52	0.16
e. Influence of wife or husband (her/his desires, career, etc.)	0.63	0.60	0.61	0.68	0.70	0.37	0.66
f. Influence of family or friends	0.36	0.35	0.32	0.41	0.36	0.23	0.39
g. High medical need in area	0.80	1.07	0.68	0.69	0.81	0.77	0.80
h. Influence of preceptorship program	0.06	0.06	0.03	0.08	0.05	0.01	0.07
I. Having gone through medical school or internship in area	0.14	0.11	0.16	0.14	0.17	0.23	0.11
J. Advice of older physician	0.05	0.02	0.05	0.08	0.05	0.01	0.06
k. Organized efforts of community to recruit physicians	0.38	0.53	0.33	0.31	0.37	0.57	0.35
l. Opportunities for social life	0.05	0.05	0.02	0.06	0.06	0.00	0.05
m. Recreational and sports facilities	0.45	0.28	0.54	0.51	0.38	0.27	0.52
n. Quality of educational system for children	0.39	0.29	0.36	0.49	0.39	0.35	0.39
o. Prospect of being more influential in community affairs	0.08	0.10	0.11	0.05	0.13	0.03	0.07
p. Cultural advantages	0.07	0.05	0.08	0.07	0.11	0.01	0.06
q. Prosperity of community	0.11	0.11	0.08	0.14	0.16	0.07	0.10
r. Preference for urban or rural living	0.88	0.67	1.06	0.89	0.86	0.52	0.97
s. Availability of hospital facilities and personnel	0.75	0.60	0.81	0.81	0.81	0.66	0.74
t. Availability of good social service, welfare, or home care services	0.01	0.03	0.00	0.00	0.00	0.03	0.01
u. Opportunities for regular contact with a medical school or medical center	0.06	0.10	0.04	0.04	0.08	0.03	0.06
v. Opportunity for regular contact with other physicians	0.28	0.27	0.30	0.27	0.30	0.27	0.28
w. Opportunity to join desirable partnership or group practice	0.63	0.50	0.63	0.73	0.35	0.35	0.80
x. Availability of loans for beginning practice	0.11	0.13	0.08	0.11	0.03	0.05	0.15
y. Opportunity to work with specific institution	0.08	0.06	0.15	0.04	0.13	0.09	0.06
z. Access to continuing medical education	0.04	0.04	0.03	0.04	0.08	0.07	0.01

* The "importance" score is calculated by assigning factor points as follows:
Most important = 5
Second importance = 3
Third importance = 1

TABLE A.14
RANKING OF FACTORS BY IMPORTANCE SCORE* FOR NON-NHSC PHYSICIANS, BY TYPE AND LOCATION CHOICE, AND FOR NHSC PHYSICIANS, BY LOCATION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	0.42	0.73	0.32	0.35	0.56	0.29	0.82	1.71	0.57	0.89	0.45	0.31
b. Climate or geographic features of area	1.36	1.25	1.91	1.43	1.19	2.03	0.98	1.59	0.88	1.84	1.33	1.50
c. Having been brought up in such a community	0.70	0.96	0.54	0.68	1.02	0.54	0.82	0.59	0.57	0.23	0.37	0.50
d. Payment of "forgiveness loan"	0.21	0.19	0.09	0.24	0.23	0.09	0.06	0.00	0.04	0.16	0.42	0.35
e. Influence of wife or husband (her/his desires, career, etc.)	0.70	0.82	0.85	0.71	0.80	0.90	0.67	0.94	0.39	0.96	0.72	1.02
f. Influence of family or friends	0.33	0.58	0.28	0.38	0.57	0.26	0.04	0.65	0.48	0.46	0.24	0.29
g. High medical need in area	0.72	0.96	0.78	0.69	1.05	0.68	0.88	0.41	1.65	0.84	1.72	1.13
h. Influence of preceptorship program	0.10	0.03	0.03	0.11	0.04	0.04	0.02	0.00	0.00	0.02	0.03	0.03
i. Having gone through medical school	0.11	0.07	0.05	0.12	0.08	0.06	0.00	0.00	0.04	0.07	0.19	0.06
j. Advice of older physician	0.02	0.07	0.00	0.02	0.03	0.00	0.00	0.29	0.00	0.02	0.00	0.00
k. Organized efforts of community to recruit physicians	0.19	0.21	0.14	0.16	0.23	0.13	0.37	0.12	0.17	0.21	0.35	0.19
l. Opportunities for social life	0.04	0.10	0.02	0.03	0.09	0.02	0.16	0.18	0.00	0.05	0.03	0.03
m. Recreational and sports facilities	0.35	0.36	0.37	0.37	0.33	0.35	0.25	0.59	0.52	0.32	0.28	0.39
n. Quality of educational system for children	0.30	0.21	0.15	0.20	0.19	0.14	0.90	0.35	0.30	0.25	0.08	0.27
o. Prospect of being more influential in community affairs	0.02	0.04	0.02	0.03	0.05	0.02	0.00	0.00	0.00	0.00	0.07	0.10
p. Cultural advantages	0.08	0.05	0.09	0.10	0.06	0.10	0.00	0.00	0.00	0.04	0.05	0.06
q. Prosperity of community	0.07	0.05	0.07	0.08	0.06	0.06	0.00	0.00	0.22	0.04	0.10	0.03
r. Preference for urban or rural living	1.34	1.14	1.50	1.30	1.27	1.50	1.53	0.41	1.52	1.14	0.92	1.39
s. Availability of hospital facilities and personnel	0.47	0.32	0.56	0.50	0.37	0.56	0.27	0.06	0.61	0.29	0.41	0.39
t. Availability of good social service, welfare, or home care services	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
u. Opportunities for regular contact with a medical school or medical center	0.04	0.00	0.03	0.03	0.00	0.04	0.06	0.00	0.00	0.00	0.06	0.09
v. Opportunity for regular contact with other physicians	0.15	0.02	0.15	0.16	0.01	0.16	0.10	0.06	0.04	0.25	0.25	0.14
w. Opportunity to join desirable partnership or group practice	1.06	0.55	0.86	1.09	0.55	0.85	0.86	0.53	0.91	0.59	0.29	0.30
x. Availability of loans for beginning practice	0.03	0.09	0.02	0.02	0.05	0.02	0.08	0.35	0.04	0.00	0.09	0.00
y. Opportunity to work with specific institution	0.01	0.03	0.05	0.02	0.00	0.06	0.00	0.18	0.04	0.02	0.18	0.05
z. Access to continuing medical education	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05	0.08	0.02

*The "importance" score is calculated by assigning factor points as follows:
Most important = 5
Second importance = 3
Third importance = 1

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TABLE A.15
RANKING OF FACTORS BY IMPORTANCE SCORE*
FOR NON-NHSC PHYSICIANS, BY TYPE AND LOCATION CHOICE,
AND NHSC PHYSICIANS, BY LOCTION CHOICE

Characteristics	NON-NHSC PHYSICIANS									NHSC ALUMNI		
	All			MD's			DO's					
	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA	Non-HMSA	HMSA	Part HMSA
TOTAL NUMBER	360.00	118.00	222.00	309.00	101.00	199.00	51.00	17.00	23.00	56.00	116.00	105.00
a. Income potential	0.47	0.70	0.36	0.43	0.56	0.34	0.75	1.53	0.57	0.68	0.47	0.34
b. Climate or geographic features of area	0.90	0.84	1.18	0.87	0.80	1.23	1.06	1.06	0.74	1.66	1.03	1.46
c. Having been brought up in such a community	0.62	0.82	0.54	0.63	0.89	0.55	0.53	0.41	0.43	0.25	0.37	0.30
d. Payment of "forgiveness loan"	0.23	0.16	0.07	0.27	0.19	0.08	0.02	0.00	0.04	0.16	0.35	0.36
e. Influence of wife or husband (her/his desires, career, etc.)	0.89	0.96	0.84	0.91	0.91	0.87	0.80	1.24	0.61	0.75	0.78	0.95
f. Influence of family or friends	0.46	0.71	0.32	0.52	0.67	0.30	0.10	0.94	0.48	0.36	0.34	0.25
g. High medical need in area	0.66	1.03	0.86	0.68	1.10	0.77	0.59	0.59	1.61	0.75	1.71	1.11
h. Influence of preceptorship program	0.09	0.06	0.07	0.10	0.07	0.08	0.02	0.00	0.00	0.09	0.02	0.03
i. Having gone through medical school	0.11	0.07	0.04	0.11	0.05	0.02	0.10	0.18	0.22	0.02	0.17	0.14
j. Advice of older physician	0.06	0.03	0.03	0.05	0.03	0.03	0.14	0.06	0.04	0.16	0.00	0.06
k. Organized efforts of community to recruit physicians	0.31	0.53	0.34	0.32	0.56	0.32	0.25	0.29	0.52	0.21	0.57	0.39
l. Opportunities for social life	0.08	0.06	0.01	0.06	0.07	0.02	0.16	0.00	0.00	0.02	0.09	0.06
m. Recreational and sports facilities	0.34	0.31	0.32	0.34	0.29	0.30	0.33	0.47	0.48	0.36	0.22	0.40
n. Quality of educational system for children	0.38	0.12	0.17	0.28	0.14	0.15	0.94	0.00	0.30	0.36	0.16	0.32
o. Prospect of being more influential in community affairs	0.03	0.04	0.03	0.04	0.05	0.03	0.00	0.00	0.00	0.09	0.09	0.09
p. Cultural advantages	0.08	0.04	0.10	0.09	0.05	0.12	0.00	0.00	0.00	0.02	0.07	0.13
q. Prosperity of community	0.60	0.01	0.09	0.07	0.01	0.08	0.00	0.00	0.20	0.11	0.10	0.03
r. Preference for urban or rural living	0.91	0.69	0.93	0.82	0.76	0.95	1.45	0.24	0.74	1.11	0.57	1.09
s. Availability of hospital facilities and personnel	0.44	0.41	0.65	0.43	0.40	0.65	0.47	0.47	0.65	0.46	0.47	0.48
t. Availability of good social service, welfare, or home care services	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u. Opportunities for regular contact with a medical school medical center	0.03	0.02	0.03	0.03	0.01	0.04	0.06	0.06	0.00	0.00	0.05	0.03
v. Opportunity for regular contact with other physicians	0.18	0.04	0.20	0.19	0.04	0.21	0.08	0.06	0.09	0.25	0.22	0.15
w. Opportunity to join desirable partnership or group practice	1.41	0.87	1.48	1.50	0.87	1.53	0.88	0.86	1.09	0.79	0.44	0.33
x. Availability of loans for beginning practice	0.06	0.17	0.05	0.04	0.14	0.04	0.16	0.35	0.13	0.00	0.03	0.00
y. Opportunity to work with specific institution	0.04	0.03	0.10	0.03	0.01	0.11	0.12	0.18	0.04	0.00	0.18	0.08
z. Access to continuing medical education	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.05	0.04	0.01

*The "importance" score is calculated by assigning factor points as follows:
Most important = 5
Second importance = 3
Third importance = 1

TABLE A.16

PRODUCT MOMENT AND TETRACHORIC CORRELATIONS BETWEEN
THE GENERAL KIND OF LOCATION QUESTIONS

Factor	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
a. INCOME	**	.08	.01	-.01	.09	.04	.05	.00	.04	.11	.16	.17	.09	.23	.06	.14	.31	.03	.15	.12	.10	.19	.11	.17	-.01	.14
b. CLIMATE	.15	**	-.03	.01	.17	-.05	.08	.01	-.02	-.01	.06	.13	.34	.09	.04	.13	.10	.21	.14	.06	.05	.13	.08	.06	-.02	.11
c. BROUGHT	.01	-.05	**	.06	.01	.17	-.01	.01	.03	.05	-.05	-.05	.01	.05	.02	-.05	.03	.13	.04	.03	-.05	.01	-.01	.02	-.02	-.01
d. FORGIVE	-.01	.02	.10	**	.03	-.01	.09	-.01	.08	-.01	.09	.00	-.04	-.04	.02	.01	.01	.02	-.01	.06	.05	.01	-.09	.06	.06	.08
e. SPOUSE	.14	.30	.01	.05	**	.11	-.01	.03	.02	.05	.06	.12	.12	.25	.06	.11	.10	.10	.17	.07	.09	.17	.15	.05	.04	.13
f. FAMILY	.07	-.09	.28	-.02	.18	**	-.01	.06	.02	.13	.02	.07	-.01	.07	.09	.05	.04	-.02	.00	.07	.02	.07	.07	.06	.05	.05
g. NEED	.08	.14	-.01	.18	-.02	-.02	**	.05	.02	-.01	.18	.04	.07	.04	.14	-.02	.01	.14	.11	.13	.07	.09	-.06	.13	.03	.06
h. PROGRAM	.00	.02	.02	-.02	.06	.12	.09	**	.12	.09	-.02	.05	.03	.07	.02	.08	.02	.03	.04	.04	.02	.06	.09	.07	.02	-.01
i. NEAR	.07	-.05	.05	.16	.04	.04	.03	.24	**	.07	-.01	.03	-.04	.01	.06	.05	.04	.02	.04	.04	.17	.11	.07	.02	.03	.13
j. ADVICE	.26	-.01	.11	-.04	.11	.30	-.02	.22	.18	**	.01	.02	.04	.06	.09	.06	.06	.02	.03	.10	.04	.01	.05	.04	.05	.03
k. RECRUIT	.25	.11	-.08	.16	.09	.03	.31	-.05	-.02	.02	**	.10	.04	.09	.12	.02	.09	.05	.11	.08	.07	.16	.00	.25	.04	.08
l. SOCIAL	.29	.27	-.09	.01	.21	.12	.06	.11	.05	.06	.18	**	.31	.24	.10	.36	.25	.05	.20	.20	.12	.27	.15	.07	.03	.16
m. SPORTS	.15	.57	.01	-.08	.18	-.02	.11	.07	-.08	.10	.07	.53	**	.17	.05	.21	.11	.18	.14	.12	.02	.15	.12	.01	.01	.08
n. SCHOOLS	.13	.16	.08	-.08	.39	.12	.07	.13	.02	.15	.14	.40	.26	**	.12	.22	.32	.15	.30	.19	.13	.27	.20	.12	.08	.19
o. INFLNCE	.11	.08	.03	.04	.11	.17	.27	.05	.11	.22	.22	.19	.09	.21	**	.09	.08	.08	.08	.12	.11	.10	.01	.09	.09	.10
p. CULTURE	.26	.31	-.10	.02	.20	.11	-.04	.16	.10	.15	.05	.59	.39	.40	.18	**	.26	.01	.13	.17	.24	.23	.17	.07	.08	.22
q. PROSPER	.51	.19	.06	.03	.18	.07	.02	.05	.07	.14	.15	.42	.20	.53	.15	.46	**	.06	.27	.17	.12	.22	.16	.11	-.01	.14
r. URBAN	.05	.36	.23	.05	.18	-.03	.24	.07	.03	.07	.09	.10	.31	.26	.16	.02	.11	**	.21	.06	-.01	.08	.08	.08	.00	.00
s. HOSPITL	.24	.24	.06	-.03	.27	-.01	.17	.09	.07	.07	.19	.37	.23	.48	.15	.27	.49	.36	**	.21	.10	.40	.24	.12	.09	.17
t. SERVICE	.24	.16	.06	.13	.14	.14	.28	.11	.09	.25	.17	.38	.24	.38	.24	.34	.33	.15	.50	**	.24	.24	.10	.09	.16	.31
u. MEDSCOL	.19	.12	-.10	.10	.17	.03	.14	.04	.31	.10	.14	.22	.05	.23	.22	.44	.22	-.03	.20	.46	**	.28	.09	.07	.08	.40
v. DOCTORS	.29	.23	.02	.02	.27	.12	.14	.11	.20	.01	.26	.44	.23	.41	.18	.41	.36	.15	.61	.48	.50	**	.34	.04	.08	.34
w. PARTNERS	.17	.15	-.01	-.16	.24	.12	-.10	.18	.13	.12	.01	.25	.19	.31	.02	.31	.27	.13	.38	.21	.16	.52	**	-.03	.00	.13
x. LOANS	.33	.14	.04	.13	.11	.12	.27	.17	.06	.12	.46	.15	.03	.23	.19	.15	.22	.19	.26	.21	.15	.09	-.06	**	.04	.09
y. INSTUTE	-.04	-.07	-.07	.18	.10	.15	.08	.08	.09	.17	.11	.10	.02	.22	.26	.22	-.05	-.01	.30	.41	.22	.22	-.01	.13	**	.14
z. NEDED	.26	.24	-.01	.15	.24	.10	.12	-.04	.25	.08	.15	.29	.15	.34	.19	.40	.26	.00	.34	.56	.64	.59	.24	.19	.37	**

NOTE: The entries above the diagonal are product moment correlations; entries below the diagonal are tetrachoric correlations.

BEST COPY AVAILABLE

BEST COPY AVAILABLE

TABLE A.17

PRODUCT MOMENT AND TETRACHORIC CORRELATIONS BETWEEN
THE SPECIFIC KIND OF LOCATION QUESTIONS

Factor	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
a. INCOME	**	.12	.05	.06	.04	.04	.09	-.01	.01	.13	.10	.15	.07	.18	.10	.07	.26	.08	.20	.12	.06	.15	.03	.17	-.03	.09
b. CLIMATE	.19	**	.05	.02	.10	-.02	.13	.10	.03	.00	.08	.16	.40	.10	.11	.07	.08	.26	.12	.11	.01	.15	.02	.06	.01	.11
c. BROUGHT	.08	.08	**	.07	.03	.24	.05	.09	.02	.08	-.06	.03	.02	.05	.07	-.02	.08	.18	.09	.07	.00	.07	.02	.00	.00	.06
d. FORGIVE	.11	.04	.14	**	.01	.04	.14	.05	.02	.05	.08	.01	-.03	-.03	.00	.08	-.02	.02	.04	.12	.08	.04	-.10	.05	.08	.13
e. SPOUSE	.07	.16	.05	.02	**	.03	-.01	.05	.04	.04	.02	.16	.14	.24	.11	.12	.08	.10	.13	.08	.08	.16	.08	.05	-.01	.10
f. FAMILY	.08	-.04	.40	.08	.05	**	.02	.04	.01	.14	-.05	.10	-.02	.02	.09	.03	.02	.04	-.01	.01	.02	.07	.09	-.02	.04	.08
g. NEED	.14	.20	.09	.27	-.03	.04	**	.10	.03	.07	.26	.06	.09	.03	.23	.03	.02	.19	.12	.14	.08	.10	-.09	.13	.04	.08
h. PROGRAM	-.04	.22	.19	.12	.11	.09	.21	**	.13	.06	-.02	.03	.03	.05	.07	.07	.02	.08	.07	.06	.06	.16	.07	.01	.00	.19
i. NEAR	.03	.05	.04	.05	.09	.02	.07	.29	**	.04	.00	.07	.05	.03	.09	.02	.00	.03	.09	.08	.19	.15	.03	.03	.07	.15
j. ADVICE	.29	-.01	.18	.14	.08	.31	.16	.16	.11	**	.06	.04	.05	.06	.10	.08	.13	.05	.07	.03	.09	.07	.01	.04	.02	.08
k. RECRUIT	.16	.13	-.10	.16	.03	-.09	.42	-.05	.00	.14	**	.06	.06	.03	.17	.02	.01	.09	.09	.10	.12	.09	-.08	.21	.05	.07
l. SOCIAL	.29	.33	.06	.03	.31	.20	.11	.07	.15	.12	.13	**	.32	.22	.17	.37	.22	.16	.16	.20	.13	.22	.05	.07	.07	.15
m. SPORTS	.12	.62	.03	-.06	.22	-.04	.15	.08	.10	.13	.11	.60	**	.16	.11	.21	.15	.27	.16	.15	.03	.16	.06	.04	.00	.10
n. SCHOOLS	.29	.16	.08	-.07	.38	.04	.06	.10	.05	.13	.06	.42	.26	**	.16	.17	.28	.15	.25	.18	.11	.23	.12	.06	.03	.14
o. INFLNCE	.18	.22	.13	-.01	.20	.18	.44	.17	.20	.24	.30	.34	.20	.29	**	.11	.11	.12	.14	.14	.16	.19	.05	.10	.08	.20
p. CULTURE	.16	.14	-.04	.18	.25	.07	.07	.17	.05	.20	.05	.65	.42	.34	.24	**	.20	.09	.15	.20	.14	.15	.04	.06	.05	.17
q. PROSPER	.45	.15	.14	-.04	.14	.04	.04	.04	-.01	.29	.01	.41	.26	.48	.22	.40	**	.12	.23	.18	.13	.18	.09	.15	-.01	.15
r. URBAN	.14	.41	.31	.05	.16	.06	.29	.18	.06	.13	.15	.32	.43	.24	.24	.19	.23	**	.23	.12	.09	.20	.07	.05	.05	.07
s. HOSPITL	.32	.20	.14	.07	.20	-.02	.19	.16	.17	.17	.15	.32	.25	.40	.27	.32	.42	.36	**	.23	.15	.37	.13	.15	.09	.19
t. SERVICE	.26	.27	.15	.28	.17	.03	.31	.17	.19	.09	.21	.42	.33	.38	.30	.43	.37	.28	.55	**	.26	.27	.07	.04	.18	.38
u. MEDSCOL	.11	.03	-.01	.17	.16	.05	.17	.15	.39	.23	.24	.29	.06	.23	.33	.31	.27	.18	.31	.51	**	.28	.08	.09	.15	.49
v. DOCTORS	.25	.24	.13	.07	.25	.13	.17	.33	.29	.15	.15	.41	.25	.37	.35	.30	.31	.34	.58	.56	.52	**	.25	.02	.15	.32
w. PARTNERS	.05	.03	.03	-.19	.13	.14	-.14	.14	.05	.03	-.14	.09	.10	.19	.09	.08	.16	.12	.21	.16	.16	.39	**	-.08	.01	.10
x. LOANS	.34	.12	.01	.11	.11	-.04	.26	.03	.08	.12	.40	.16	.09	.13	.21	.14	.31	.10	.31	.10	.21	.04	-.18	**	.01	.09
y. INSTUTE	-.08	.01	.01	.20	-.03	.09	.11	.01	.19	.07	.12	.18	.00	.07	.20	.14	-.02	.12	.23	.42	.35	.35	.02	.02	**	.24
z. MEDED	.19	.24	.13	.27	.21	.16	.17	.28	.32	.20	.15	.32	.21	.29	.40	.36	.30	.15	.40	.67	.77	.60	.21	.22	.51	**

NOTE: Entries above the diagonal are product moment correlations; entries below the diagonal are tetrachoric correlations.

TABLE A.18

PRODUCT MOMENT CORRELATION MATRIX OF RESPONSES TO THE GENERAL AND SPECIFIC KIND OF LOCATION QUESTIONS

General \ Specific	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
a. INCOME	.57	.08	.07	.03	.07	.01	.08	-.01	.03	.10	.08	.10	.03	.14	.07	.04	.24	.10	.15	.07	.02	.16	.03	.14	-.02	.04
b. CLIMATE	.02	.48	-.02	.00	.10	-.06	.06	.04	-.01	-.04	.00	.11	.26	.04	.07	.07	.05	.18	.08	.05	.00	.06	.07	.00	-.01	.04
c. BROUGHT	.02	-.03	.65	.07	-.01	.21	.01	.06	.01	.06	-.07	-.02	-.03	-.01	.02	-.06	.03	.08	.01	.01	-.05	.00	.01	.00	-.03	-.01
d. FORGIVE	.02	.04	.05	.68	.03	-.02	.05	.04	.03	.00	.04	.03	-.01	-.04	.01	.04	-.03	.01	.01	.06	.07	.01	-.08	.03	.06	.08
e. SPOUSE	.06	.06	.00	.01	.65	-.01	-.06	.01	.01	.01	-.01	.10	.06	.16	.08	.09	.07	.07	.07	.05	.06	.10	.09	.01	.03	.09
f. FAMILY	.03	-.08	.18	.03	.06	.56	-.04	.03	.01	.11	-.03	.02	-.12	-.03	.11	.00	-.04	-.02	-.02	.01	.01	.04	.03	.04	.04	.06
g. NEED	.07	.12	.02	.09	.00	-.03	.55	.01	.02	.02	.17	.01	.08	.03	.17	.01	.01	.12	.08	.12	.06	.06	-.08	.13	.00	.07
h. PROGRAM	-.04	.02	.03	-.01	.02	-.01	.04	.51	.08	-.02	-.02	.03	-.04	.03	.03	.04	.01	.00	.04	.05	.01	.10	.06	.02	.03	.05
i. NEAR	.02	.01	.00	.06	.01	.00	.00	.07	.60	.05	.00	.04	-.04	-.00	.00	.00	.00	-.02	.04	.00	.11	.09	.05	.02	.08	.09
j. ADVICE	.06	-.03	.08	.01	.02	.08	-.06	-.01	.03	.52	.00	-.01	-.02	.02	.06	.01	.07	.02	.01	.03	.03	.00	.02	.04	.07	.06
k. RECRUIT	.14	.08	-.05	.07	.01	-.05	.15	-.04	-.01	.01	.52	.02	.01	.03	.09	-.04	.02	.06	.05	.08	.08	.07	-.05	.13	.00	.04
l. SOCIAL	.17	.10	-.04	.00	.13	.05	.03	.03	.05	.03	.05	.50	.20	.16	.14	.24	.15	.09	.11	.14	.10	.18	.06	.05	.04	.11
m. SPORTS	.03	.26	-.01	-.08	.08	-.06	.05	.00	-.03	.04	.01	.15	.58	.09	.03	.11	.06	.15	.09	.08	-.06	.08	.07	-.01	.03	.02
n. SCHOOLS	.18	.07	.06	-.01	.19	.02	.02	.03	-.01	.03	.00	.12	.08	.59	.10	.10	.20	.15	.16	.12	.07	.14	.10	.08	.05	.11
o. INFLNCE	.07	.07	.04	-.02	.06	.07	.15	.01	.03	.07	.12	.11	.06	.11	.62	.08	.06	.05	.11	.10	.10	.10	-.01	.05	.07	.13
p. CULTURE	.10	.10	-.05	.00	.08	.02	.00	.05	-.01	.00	.01	.24	.13	.09	.07	.48	.17	.02	.09	.11	.11	.08	.10	.06	.06	.14
q. PROSPER	.27	.04	.06	.01	.11	.02	.02	.01	.00	.10	.00	.15	.05	.23	.07	.11	.57	.08	.21	.10	.06	.14	.08	.10	-.05	.07
r. WEALTH	.02	.10	.11	.00	.08	.03	.11	.01	.02	.03	.07	.07	.15	.12	.04	.01	.07	.51	.16	.05	-.01	.07	.09	.04	.03	-.01
s. HOSPITL	.13	.09	.02	-.02	.12	-.03	.06	.05	.02	.04	.04	.08	.08	.19	.09	.06	.16	.16	.52	.15	.07	.24	.14	.09	.07	.10
t. SERVICE	.14	.12	.10	.07	.07	.01	.11	.07	.05	.06	.05	.14	.10	.15	.10	.17	.15	.13	.15	.61	.17	.21	.07	.04	.12	.28
u. NEDSCOL	.05	-.01	-.03	.04	.07	-.01	.08	.01	.17	.09	.06	.09	.05	.10	.13	.14	.07	.04	.09	.17	.58	.18	.03	.05	.09	.31
v. DOCTORS	.15	.10	.01	-.01	.14	.04	.07	.10	.11	.06	.05	.16	.08	.18	.10	.11	.14	.13	.26	.15	.17	.57	.24	.03	.09	.22
w. PARTNERS	.03	.06	.01	-.10	.12	.05	-.10	.05	.02	.01	-.09	.05	.05	.10	.00	.06	.05	.10	.11	.07	.03	.19	.68	-.04	-.02	.06
x. LOANS	.15	.02	.03	.02	.04	-.01	.13	.13	.01	.01	.18	.02	-.02	.06	.07	.04	.04	.07	.08	.05	.06	.01	-.08	.57	.00	.09
y. INSTUTE	.03	.06	.00	.05	.04	.03	.00	.06	.05	.01	.00	.01	.03	.05	.09	.04	-.04	.04	.05	.13	.06	.11	-.08	.00	.52	.17
z. NEDED	.12	.11	.03	.08	.11	.03	.08	.05	.14	.06	.07	.12	.13	.13	.14	.14	.09	.08	.12	.27	.28	.27	.06	.07	.10	.55

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TABLE A.19

INDIVIDUAL ITEM WEIGHTS FOR CONSTRUCTING ESTIMATES OF UNOBSERVED FACTORS

	Weights for General Location Considerations					Weights for Specific Location Considerations					
Item	Economic	Community Opportunities	Area Features	Community Recruitment	Professional Environment	Economic	Community Opportunities	Area Features	Community Recruitment	Group Practice	Professional Environment
INCOME	.377	.036		.073		.469			.041		
PROSPER	.288	.124		.029		.354	.088				
SCHOOLS		.117	.036				.073				
SOCIAL		.202	.061		.040	.097	.407	.078			.042
CULTURE		.230	.069		.046		.218				
CLIMATE		.048	.286					.093			
URBAN			.099					.052			
SPORTS		.070	.413				.110	.777	.038		
RECRUIT	.056			.242					.178		
LOANS	.079			.342					.193		
NEED				.123		.040			.179		
INFLNCE				.110					.190		
SPOUSE			.036				.051				
PARTNERS		.032				.040				.781	
DOCTORS		.047		.039	.221					.219	.117
HOSPITL					.099						.059
MEDSCOL					.150				.044		.189
NEDED		.049		.042	.232		.053		.084		.363
SERVICE		.045			.212				.053		.230

NOTE: The estimate of a given unobserved factor is computed as the weighted sum of the scores (0,1) on the individual items. For the Group Practice factor the PARTNERS item is the only general location consideration contributing to the estimate.

TABLE A.20

FREQUENCY OF SELECTION OF GENERAL FACTORS
FOR GENERAL AND SPECIFIC LOCATION CONSIDERATIONS

General Factor	All Physicians	Alumni Status		Location		
		NHSC Alumni and PPO	Non-Alumni	HMSA	Part-HMSA	Non-HMSA
General Location Considerations						
Economic	.356	.333	.370	.362	.297	.403
Community Opportunities	.308	.305	.310	.267	.323	.326
Area Features	.576	.555	.589	.511	.631	.580
Community Recruitment	.278	.310	.258	.340	.250	.275
Group Practice	.400	.290	.465	.262	.403	.504
Professional Environment	.274	.314	.250	.253	.283	.283
Spouse	.500	.534	.480	.431	.533	.525
N	1106	414	692	331	.370	421
Specific Location Considerations						
Economic	.282	.289	.277	.281	.250	.311
Community Opportunities	.193	.220	.176	.169	.209	.198
Area Features	.396	.414	.386	.346	.447	.391
Community Recruitment	.251	.291	.227	.290	.245	.227
Group Practice	.387	.303	.437	.279	.423	.439
Professional Environment	.161	.221	.126	.162	.173	.150
Spouse	.422	.460	.400	.378	.449	.434
N	1108	413	695	331	370	422

NOTE: The score for a given factor is the average frequency with which an item representing that factor was indicated as influential in determining the location decision. The scores are weighted averages, where the weights are as reported in Table A.19. An item was scored 1 if indicated as influential and 0 if not.

TABLE A.21

IMPORTANCE OF GENERAL FACTORS FOR
GENERAL AND SPECIFIC LOCATION CONSIDERATIONS

General Factor	All Physicians	Alumni Status			Location		
		NHSC Alumni	Current PPOs	Non-Alumni	HMSA	Part-HMSA	Non-HMSA
General Location Considerations							
Economic	.112	.103	.160	.105	.142	.077	.119
Community Opportunities	.069	.068	.050	.073	.060	.070	.075
Area Features	.230	.234	.141	.247	.198	.262	.227
Community Recruitment	.082	.093	.097	.074	.108	.068	.074
Group Practice	.207	.108	.080	.273	.130	.189	.282
Professional Environment	.039	.047	.038	.036	.035	.044	.038
Spouse	.238	.264	.193	.237	.227	.262	.225
N	1127	277	150	700	331	370	426
Specific Location Considerations							
Economic	.115	.103	.140	.114	.130	.094	.122
Community Opportunities	.049	.054	.028	.052	.040	.048	.057
Area Features	.142	.144	.083	.154	.101	.165	.155
Community Recruitment	.096	.107	.095	.092	.125	.087	.081
Group Practice	.229	.125	.110	.295	.154	.235	.280
Professional Environment	.028	.033	.028	.026	.028	.027	.028
Spouse	.247	.256	.173	.259	.239	.243	.256
N	1127	277	150	700	331	370	426

NOTE: The importance score for a given factor is the average frequency with which an item representing that factor was ranked either first, second or third most important in determining the location decision. The scores are weighted averages, where the weights are as reported in Table A.19 and the individual items are scored 1 if ranked in the top three and 0 otherwise.

TABLE A.22
PRIOR CONTACT WITH RURAL AREAS, BY
SELECTED PHYSICIAN CHARACTERISTICS

Physician Characteristics	TOTAL NUMBER	PRIOR CONTACT EVENT						
		Birth	Rearing		College	School	Residency	NHSC
			Self	Spouse				
All Physicians	1127.00	40.95	42.97	40.51	19.38	7.73	3.63	21.03
NHSC Physicians								
--Alumni	277.00	32.40	30.89	35.71	15.69	7.94	4.62	97.44
--Current PPO's	150.00	31.91	29.29	24.58	15.97	15.00	5.52	—
Non-NHSC Physicians								
--All	700.00	46.13	50.38	45.25	21.54	6.10	2.81	—
--MD's	609.00	45.53	49.21	43.83	19.62	2.30	1.79	—
--DO's	91.00	50.00	57.95	54.22	34.09	29.67	9.76	—
Sex								
--Male	995.00	42.25	43.91	40.36	19.30	8.19	3.79	20.44
--Female	132.00	31.50	35.59	41.94	20.00	4.17	2.44	25.83
Specialty								
--General Practice	223.00	42.11	42.72	44.25	25.60	22.93	6.44	31.46
--Family Practice	581.00	44.76	47.96	44.49	19.49	4.84	3.53	19.16
--Internal Medicine	203.00	38.14	38.34	34.27	15.38	2.05	1.55	14.81
--Pediatrics	96.00	21.98	24.14	22.54	12.09	1.12	2.22	18.68
--Other	12.00	27.27	20.00	28.57	18.18	0.00	0.00	18.18

TABLE A.23
PROBABILITY OF RURAL LOCATION OF 1979 NHSC PHYSICIANS:
EVENT CATEGORIES BY CONTACT FREQUENCY*
(number of physicians in each category are shown in parenthesis)

Physician Characteristics	TOTAL NUMBER	6EVT	5EVT	4EVT	3EVT	2EVT	1EVT	0EVT
All 1979 NHSC Physicians	178.00	100.00 (1.00)	66.67 (3.00)	33.33 (3.00)	44.44 (18.00)	52.94 (34.00)	39.81 (108.00)	50.00 (6.00)
--MD's	164.00	*	50.00 (2.00)	33.33 (3.00)	44.44 (18.00)	55.17 (29.00)	38.46 (104.00)	33.33 (3.00)
--DO's	11.00	100.00 (1.00)	100.00 (1.00)	*	*	25.00 (4.00)	75.00 (4.00)	0.00 (1.00)
--Male	147.00	100.00 (1.00)	66.67 (3.00)	33.33 (3.00)	46.67 (15.00)	48.15 (27.00)	39.33 (89.00)	25.00 (4.00)
--Female	31.00	*	*	*	33.33 (3.00)	71.43 (7.00)	42.11 (19.00)	100.00 (2.00)
--General Practice	38.00	100.00 (1.00)	100.00 (1.00)	*	20.00 (5.00)	63.64 (11.00)	75.00 (20.00)	*
--Family Practice	74.00	*	0.00 (1.00)	0.00 (1.00)	66.67 (9.00)	50.00 (14.00)	38.53 (45.00)	25.00 (4.00)
--Internal Medicine	28.00	*	*	50.00 (2.00)	33.33 (3.00)	50.00 (4.00)	27.78 (18.00)	*
--Pediatrics	13.00	*	*	*	*	100.00 (2.00)	33.33 (9.00)	100.00 (1.00)
--Other	18.00	*	*	*	0.00 (1.00)	0.00 (3.00)	8.33 (12.00)	100.00 (1.00)

* The 6 contact events are: Rural birth, Rural rearing, rural college studies, rural medical school, rural residency, and rural NHSC service.

TABLE A.24
MEAN VALUES OF EXPLANATORY VARIABLES, BY LOCATION CHOICES OF RESPONDENTS

Variables	All Physicians	CHOICE 1 1979 NHSC Alumni Urban	CHOICE 1 1979 NHSC Alumni Rural	CHOICE 2* All Physicians HMSA	CHOICE 2* All Physicians Non-HMSA	CHOICE 2* Non-Alumni HMSA	CHOICE 2* Non-Alumni Non-HMSA	CHOICE 2* NHSC Alumni HMSA	CHOICE 2* NHSC Alumni Non-HMSA	CHOICE 2* M.D.s HMSA	CHOICE 2* M.D.s Non-HMSA	CHOICE 2* D.O.s HMSA	CHOICE 2* D.O.s Non-HMSA	CHOICE 3 All NHSC Alumni Retained	CHOICE 3 All NHSC Alumni Not Retained
TOTAL NUMBERS	977	97	76	246	397	118	360	128	37	196	276	27	53	115	41
YRGRADN	8.9	8.60	8.59	9.05	8.96	9.13	8.96	—	—	9.11	8.99	8.52	8.75	—	—
TIMING	0.14	0.06	0.07	0.16	0.15	0.20	0.16	—	—	0.15	0.14	0.22	0.17	0.12	0.04
SEX	0.88	0.85	0.79	0.85	0.90	0.90	0.90	0.81	0.89	0.84	0.89	1.00	0.98	0.85	0.79
RACE	0.95	0.83	0.86	0.89	0.97	—	—	0.80	0.89	0.87	0.96	1.00	0.96	0.87	0.85
SPOUSED	0.70	0.74	0.64	0.65	0.73	0.64	0.74	0.65	0.62	0.65	0.75	0.67	0.60	0.68	0.62
PERSEVT	1.36	0.60	0.82	1.28	1.55	1.49	1.60	1.08	1.08	1.19	1.50	2.11	1.96	1.03	0.79
PROFEVT	0.09	0.04	0.13	0.09	0.09	0.08	0.09	0.10	0.14	0.04	0.04	0.55	0.42	0.14	0.08
GPFP	0.71	—	—	0.78	0.68	0.80	0.68	0.75	0.65	0.75	0.64	0.96	0.91	0.78	0.61
DO	0.13	0.05	0.08	0.12	0.14	0.14	0.14	0.09	0.06	0.00	0.00	1.00	1.00	0.12	0.08
NHSC	0.24	—	—	0.50	0.05	—	—	—	—	0.47	0.05	0.33	0.02	—	—
NHSCSITE	21517.56	20093.75	21617.25	—	—	—	—	17361.30	19470.52	—	—	—	—	22548.58	38451.95
NHSCMD	59.35	64.90	56.83	—	—	—	—	41.35	55.86	—	—	—	—	56.65	67.96
NHSCHOSP	0.83	0.75	0.85	—	—	—	—	0.74	0.95	—	—	—	—	0.83	0.84
POPDENS	39.93	40.18	36.16	—	—	—	—	28.80	30.67	—	—	—	—	29.96	37.02
SATISFAC	0.17	0.45	0.64	—	—	—	—	0.61	0.46	—	—	—	—	—	—
OTHMD	0.76	—	—	—	—	—	—	—	—	—	—	—	—	0.79	0.70
MEDSCH	0.62	—	—	—	—	—	—	—	—	—	—	—	—	0.62	0.59
CHE	0.50	—	—	—	—	—	—	—	—	—	—	—	—	0.49	0.44
HOSPFAC	0.75	—	—	—	—	—	—	—	—	—	—	—	—	0.77	0.70
SOCREC	0.71	—	—	—	—	—	—	—	—	—	—	—	—	0.79	0.68
WELFARE	0.66	—	—	—	—	—	—	—	—	—	—	—	—	0.74	0.53

*Physicians located in Part-HMSAs were excluded from the analysis since it is not known where the Part-HMSA the physician is located.

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TABLE III.1

VARIABLES AND DEFINITIONS

Variable Name		Description
		Dependent Variables
RURAL	=	1, if a rural location choice; 0 otherwise
HMSA	=	1, if a HMSA location choice; 0, otherwise
RETAINED	=	1, if alumni remained in NHSC site; o. if alumni relocated
		Independent Variables
TIMING	=	1, if the location decision was made before or during medical school; 0 if otherwise
SEX	=	1, if male; 0, otherwise
CITIZEN	=	1, if U.S. born; 0, otherwise
RACE	=	1, if white; 0, otherwise
GPFP	=	1, if general of family practice physician; 0, otherwise
IM	=	1, if internal medicine specialist; 0, otherwise
PED	=	1, if pediatric specialist; 0, otherwise
CERT	=	1, if board certified; 0, otherwise
MARITAL	=	1, if married; 0, otherwise
SPOUSED	=	1, if spouse has a college or graduate degree: 0, otherwise
BIRTH	=	1, if born in rural area; 0, otherwise
REAR	=	1, if reared in rural area; 0, otherwise
SPEAR	=	1, if spouse reared in rural area; 0, otherwise
COLLEGE	=	1, if college was in rural area; 0, otherwise
MEDSCH	=	1, if medical school was in rural area; 0, otherwise
RESID	=	1, if residency in rural area; 0, otherwise

TABLE III.1 (continued)

Variable Name		Description
EVENTS	=	Number of prior contact events
PROFEVTS	=	Number of prior professional contacts
PERSEVTS	=	Number of prior personal contacts
NHSC	=	1, if rural NHSC service; 0, otherwise
D.O.	=	1, if physician is an osteopath; 0, if an M.D.
VOLUNTEER	=	1, if NHSC alumni was a volunteer; 0, if a scholarship recipient
NHSCSITE	=	Population of site in which NHSC obligation was served
NHSCMD	=	Physician-to-population ratio in site in which NHSC obligation was served
NHSCHOSP	=	1, if site in which NHSC obligation was served has a hospital; 0, otherwise
POPDENS	=	Population per square mile in site in which NHSC obligation was served
SATISFAC	=	1, if alumni was highly satisfied with NHSC experience; 0, otherwise
OTHMD	=	1, if satisfied with interaction with other MDS; 0, otherwise
MEDSCH	=	1, if satisfied with opportunity for contact with med school; 0, otherwise
CME	=	1, if satisfied with opportunity for CME; 0, otherwise
HOSPFAC	=	1, if satisfied with availability of hospital support; 0, otherwise
SOCREC	=	1, if satisfied with social and recreational opportunities; 0, otherwise
WELFARE	=	1, if satisfied with availability of social service, welfare, or home care services; 0, otherwise
ECON	=	1, if economic factors influenced decision; 0, otherwise

TABLE III.1 (continued)

Variable Name		Description
SPOUSE	=	1, if spouse or family influenced decision; 0, otherwise
CULTURE	=	1, if cultural advantages influenced decision; 0, otherwise
RESOURCES	=	1, if availability of professional resources influenced decision; 0, otherwise
PHYSICIAN	=	1, if opportunity for contact with other physicians influenced decision; 0, otherwise
MEDED	=	1, if medical school or CME opportunities influenced decision; 0, otherwise
EDUCQUAL	=	1, if the quality of local public education influenced decision; 0, otherwise
NEED	=	1, if high medical need or area influenced decision; 0, otherwise
RECR	=	1, if climate and/or recreational opportunities influenced decision; 0, otherwise
RECRUIT	=	1, if community or local physician recruitment activities influenced decision; 0, otherwise
GROUP	=	1, if opportunity to join partnership or group practice influenced decision; 0, otherwise

TABLE III.2

RESULTS OF LOGISTIC REGRESSION OF HMSA-NONHMSA
LOCATION ON GENERAL AND SPECIFIC PREFERENCE FACTORS

Explanatory Variable	General Location Preferences			Specific Location Preferences		
	All Physicians	Non-Alumni	NHSC Alumni	All Physicians	Non-Alumni	NHSC Alumni
Intercept	.245	-.542**	1.818**	-.130	-.941**	1.372**
Economic	-.520*	—	—	-.425	-.791*	--
Community Opportunities	—	—	—	—	—	-1.205*
Community Recruitment	1.408**	.826*	1.679*	1.782**	1.339*	2.363**
Area Features	-.465*	—	-1.014*	-.330*	—	—
Professional Development	—	-1.470*	—	.754*	—	—
Group Practice	—	—	—	-1.042**	-.744**	—
PARTNER	-.976**	-.644**	-.561	—	—	-.574
SPOUSE	—	-.440*	—	—	—	—
R^2	.051	.039	.015	.049	.023	.021
Number of Cases	739	475	264	738	475	263

NOTE: PPO physicians are included among NHSC alumni and all physicians.

*Significant at the $p < .10$ level.
**Significant at the $p < .01$ level.

TABLE III.3

RESULTS OF LOGISTIC REGRESSION OF HMSA-NONHMSA
LOCATION ON PREFERENCES AND PHYSICIAN CHARACTERISTICS

Explanatory Variable	Full Specification			Reduced Specification		
	All Physicians	Non-Alumni	NHSC Alumni	All Physicians	Non-Alumni	NHSC Alumni
INTERCEPT	-1.511**	-1.716**	.361	-1.213**	-1.749**	.476
NHSC	2.927**	—	—	2.822**	—	—
GPFP	.576*	.724*	.636	.531*	.742**	—
PROFEVTS	-.458	-.230	-1.027*	—	—	-1.022*
G-Economic Factor	.107	.490	-1.636*	—	—	-1.621*
S-Area Features Factor	-.481*	-.449	-.687	-.401	—	—
S-Community Recruit Factor	.607	-.484	3.958**	—	—	3.246**
S-NEED	.775**	1.064**	-.292	.958**	.917**	—
G-PARTNERS	-.599**	-.711**	-.085	-.659**	-.754**	—
G-HOSPITAL	-.726**	-.858**	.571	-.664**	-.746**	—
G-INSTUTE	1.155*	.964	-.010	1.121*	—	—
G-MEDSCOL	-.325	-.842*	1.274*	—	-.938*	1.417*
G-BROUGHT	.088	-.030	1.080*	—	—	1.158*
G-URBAN	.336	.646*	-.502	—	.588*	—
R^2	.243	.077	.045	.253	.094	.096
Number of Cases	607	473	160	605	472	160

NOTE: PPO physicians are excluded from these equations.

*Significant at the $p < .10$ level.
**Significant at the $p < .01$ level.

IV. ANALYSIS OF PHYSICIANS' PRACTICE CHARACTERISTICS

A. OBJECTIVES

The effect of the National Health Service Corps experience on physicians' subsequent practice location choice has been examined and findings reported in Chapter III. The possibility exists that the NHSC experience may influence the way in which alumni practice, in addition to where they practice. If so, alumni who choose to locate a permanent practice in an area which is not a HMSA may still practice in ways which increase access to services for underserved segments of the population. For example, an NHSC alumni may offer a sliding fee scale to patients or may accept assignment of Medicare benefits more frequently than physicians without Corps' experience. The objective of the descriptive analysis reported in this chapter is to examine and compare the practice characteristics of NHSC alumni and non-alumni. Another issue of interest is the practice characteristics of recent Private Practice Option NHSC physicians. Since 1983, the Corps has moved to place substantial numbers of obligated phyicians in PPO settings. To date, there have been no comprehensive attempt to examine the characteristics of these PPO practices -- beyond the investigation necessary to ensure that the practice is appropriate to meet the physician's obligation.

In this chapter we examine data on practice characteristics of physician respondents to the 1984 Survey of Young Physicians in Non-Metropolitan Areas, and present the results of this examination.

B. DATA AND VARIABLES

The sources of data for the examination of practice characteristics of physicians respondents include:

- o Survey data on practice characteristics. Table IV.1 summarizes these data.
- o Survey and AMA/AOA data on personal and professional characteristics.
- o Area Resource File and HMSA File data on area characteristics.

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[1] PPOs who were surveyed had established practices by early 1984. Consequently, their locations and practice characteristics may be quite different from those of more recent PPOs who entered under different guidelines for acceptable practice.

TABLE IV.1
PRACTICE CHARACTERISTICS DATA COLLECTED THROUGH
THE SURVEY OF OF YOUNG PHYSICIANS IN
NON-METROPOLITAN AREAS

Variable		Definition
PRACNUM	=	Number of practices
PCTHMSA	=	Percent of practice located in wholly or partially designated HMSAs
SOLO	=	1, if in solo practice; 0, otherwise
GROUP	=	1, if in a group practice arrangement; 0, otherwise
COMMUN	=	1, if in Community Health Center; 0, otherwise
MIGRANT	=	1, if in Migrant Health Center; 0, otherwise
TIME PRAC	=	Number of years with primary practice
AGE PRAC	=	Number of years primary practice has existed
FTEMDs	=	Number of full-time equivalent physicians providing services in primary practice
NPS	=	Number of nurse practitioners providing services in primary practice
PAS	=	Number of physicians' assistants providing services in primary practice
PATIENTS	=	Number of patients seen in typical week
NEWPATS	=	Number of new patients seen in typical week
ACCEPT	=	1, if accepting new patients; 0 otherwise
HOSPATS	=	Number of patients in hospital in a typical week
PTHRS	=	Number of direct patient care hours provided in the office in a typical week
PERHOURS	=	Number of patients seen per hour in a typical week

TABLE IV.1 (continued)

Variable		Definition
TELPATS	=	Number of telephone consultations in a typical day
WKSWORK	=	Number of weeks worked in past year
EVENING	=	1, if regularly schedule evening office hours; 0, otherwise
WEEKEND	=	1, if regularly schedule weekend office hours; 0, otherwise
FEE NEW	=	Fee for new patient visit
FEEFOFF	=	Fee for follow up office visit
FEEHOSP	=	Fee for visit to hospitalized patient
PCTBLUE	=	Percent patients with Blue Shield insurance
PCTPRIV	=	Percent patients with other private insurance
MEDICARE	=	Percent patients with Medicare
MEDICAID	=	Percent patients with Medicaid
NOINS	=	Percent patients with no insurance for physicians services
ASSIG	=	1, if physician accepts assignment for Medicare; 0, otherwise
NEWMED	=	1, if accepts new Medicaid patients; 0, otherwise
SLIDE	=	1, if regularly uses a sliding fee scale; 0, otherwise
DISCNT	=	Percent of physicians who report giving discounts
COLLRAT	=	Collection ratio

C. METHODOLOGY

To determine whether different practice patterns are evident for NHSC alumni and non-alumni, we examined the means of the practice characteristics variables for NHSC alumni and all other physicians. This analysis was conducted separately for those physicians located in HMSAs and those in non-HMSA areas, and by region of the the country.

Recent PPOs were examined separately. Certain practice characteristics (e.g. acceptance of Medicaid patients) data were not collected for PPOs since these characteristics are requirements of PPO service. Of interest, however, was examination of differences in practice chararacteristics of these PPOs by their practice setting and region.

D. FINDINGS

The analysis of practice characteristics of young physicians was conducted for two purposes:

1. To examine whether there are differences between NHSC alumni and non-alumni in their practice patterns and whether any differences that are evident vary by characteristics of physicians and the geographic area, including:

   -- specialty
   -- board certification
   -- HMSA status
   -- region of the country

2. To describe the practice characteristics of PPO physicians and to determine whether there are differences by the PPOs' specialty and board certification status and by the region of the country in which the PPO is located.

Results of these analyses are summarized in this section.

1. Comparison of NHSC Alumni and Non-Alumni Practice Characteristics

When the practice characteristics of all NHSC alumni and non-alumni are compared (Table B.1), a number of differences between the two groups are apparent:

- NHSC alumni report providing direct patient care at more practice sites than do non-alumni and have a much higher proportion of HMSA patients in their practices.

- Alumni are somewhat more likely to report being in a solo practice than are non-alumni who are most likely to be in group practice.

- Community and migrant health center practices are reported by 29 percent of alumni; only 5 percent of non-alumni are in CHC or MHC settings.

- Alumni are more often in practices which have existed for fewer years, which have fewer physicians, and have been with the practice a shorter time than non-alumni.

- Alumni are more often in practices which include nurse-practitioners than are non-alumni; although there is no apparent difference in the use of physicians' assistants by the two groups.

- Alumni see only slightly fewer patients per week than non-alumni; but see more new patients.

- While alumni work more hours a week, on average, than non-alumni, non-alumni report working nearly a week more per year.

- Alumni are more likely to work in the evenings, but there is no difference in the percent of each group who report holding weekend office hours.

- Alumni charge consistently lower fees than non-alumni and report lower proportions of patients with insurance.

- Alumni report nearly one-third more Medicaid patients than non-alumni and are much more likely (50% compared to 28%) to accept assignment for Medicare claims.

- Although alumni use a sliding fee scale and more frequently discount their services than non-alumni, they do report higher collection ratios than non-alumni.

Overall, these results suggest that NHSC alumni do have somewhat different practice characteristics than do non-alumni. These differences are in the direction that was expected; alumni are more frequently providing services to population in HMSAs, CHCs, and MHCs, have more accessible hours, charge less and provide discounts more frequently, accept assignment for Medicare claims, and see more Medicaid patients.

a. Differences by Type of Physician

Table B.1 also presents practice characteristics of M.D.s and D.O.s, separately. When compared to M.D.s, osteopathic physicians are:

- o less likely to practice in HMSAs
- o more likely to be in solo practice
- o see more patients per week
- o work more hours a week, but fewer weeks a year
- o accept assignment for Medicare claims more frequently than non-alumni, but less often than NHSC alumni.

b. Differences by Specialty

When we examine the practice characteristics of NHSC alumni and non-alumni, by specialty (Tables B.2 - B.4), some differences are evident:

- o GP/FP physicians tend to see more patients per week, have fewer patients in the hospital, work more hours, charge lower fees, and are more likely to accept assignment for Medicare claims. However, the differences between alumni and non-alumni practice characteristics persist when examined for GP/FPs only.
- o Internists (IM) who are alumni are somewhat more likely to be in a group practice and, for alumni and non-alumni, in group practices which have more physician members. Internists see fewer patients per week, work fewer hours per week, are less likely to offer evening and weekend hours, and charge higher fees. In addition, although they have fewer Medicaid patients and more patients with insurance, internal medicine specialists report more frequent use of sliding scale fee schedules and more frequently discount their services. When IM alumni and non-alumni differences are compared with all alumni and non-alumni, a few differences are evident:
  - -- IM non-alumni report more HMSA patients than all non-alumni
  - -- IM non-alumni tend to have been with their practice a shorter time than all non-alumni
  - -- IM alumni are less likely to accept assignment for Medicare claims than are all alumni
- o Pediatricians (PDs) have a much younger patient population and that, in part, accounts for some of the differences observed for this group:

-- Alumni PDs are more likely to be in HMSA practice; non-alumni PDs are less likely to have HMSA patients.

-- Alumni PDs are more likely to be in solo practice than all alumni; non-alumni PDs are less likely than all non-alumni to be in solo practice; alumni PDs tend to be in younger practices than all alumni.

-- Alumni PDs are less likely to use NPs in their practice than all alumni; non-alumni PDs are more likely to report using NPs in their practices.

-- Alumni PDs see fewer patients per week than all alumni.

-- All PDs provide more telephone services than other physicians, provide evening and weekend hours more frequently have more Medicaid patients, but are somewhat less likely to using sliding fee scales or to give discounts for services.

Although some differences emerge when practice characteristics are compared for alumni and non-alumni, by specialty, these differences are not substantial. The specialty distribution for the two groups is similar:

	Alumni	Non-Alumni
GP/FP	77%	71%
IM	15	20
PD	8	9

Consequently, it is not likely that the differences in practice characteristics between alumni and non-alumni could be explained by specialty differences between the two groups.

c. Differences by Board Certification Status

Only 59 percent of NHSC alumni in our sample are board certified in their primary specialty; 75 percent of non-alumni report board certification. When the practice characteristics of board-certified alumni and non-alumni are compared (Table B.5), however, the differences are consistent with the practice characteristic differences observed for all alumni and non-alumni. A few differences between all alumni and non-alumni and board-certified, only, are found:

o Board certified physicians report slightly less HMSA practice than all physicians

- o Solo practice is less common for board certified physicians

- o Physicians who are board certified see somewhat fewer patients per week than all physicians and work fewer hours

- o Board certified physicians are less likely to accept assignment for Medicare claims than are all physicians.

These differences are consistent regardless of NHSC status. However, the fact that fewer alumni are board certified may, in part, explain differences between alumni and non-alumni practice characteristics.

d. Differences by HMSA Status

One potential explanation for differences in practice characteristics between NHSC alumni and non-alumni is that many NHSC alumni have remained in the NHSC site in which they served and, therefore, may have continued the practice style they learned in that site. In Tables B.7 and B.8, we examine the practice characteristics of alumni and non-alumni in whole county HMSAs and non-HMSAs. Only 15 percent of non-alumni are practicing in whole county HMSAs, compared with 42 percent of NHSC alumni in our sample. Results indicate that:

- o There is no difference between the percent HMSA patients seen by alumni and non-alumni, when HMSA location is accounted for.

- o Alumni and non-alumni are more likely to be in solo practice in HMSAs; although more non-alumni report solo practice in HMSAs.

- o Alumni are more likely to work in a CHC in HMSA locations; but non-alumni continue to infrequently report such practice.

- o Alumni in HMSA locations report more use of NPs; non-alumni in HMSA locations use NPs less often than non-alumni in non-HMSA sites.

- o Alumni in HMSAs see fewer patients per week than do alumni in non-HMSAs and work slightly more hours; however, non-alumni in whole county HMSAs see more patients per week than do alumni in HMSA locations or physicians in non-HMSA locations. This suggests that non-alumni may locate in HMSAs with particularly high levels of demand.

- o HMSA physicians are more likely to report evening hours and less likely to offer weekend hours than non-HMSA physicians; however, alumni and non-alumni differentials remain.

- o HMSA physicians report more Medicaid patients and are more likely to accept assignment for Medicare claims than are non-HMSA physicians; the differential between alumni and non-alumni persist in HMSAs and is greater for the Medicare assignment issue. However, in non-HMSAs, there is no difference in the frequency of acceptance of Medicare assignment by alumni and non-alumni.

- o All HMSA physicians are slightly more likely than non-HMSA physicians to report using sliding fee schedules and to give discounts; though the differential between alumni and non-alumni persists. However, there is little difference in these practices between alumni and non-alumni in non-HMSA counties.

Overall, it is evident that practice characteristics are different in HMSAs and non HMSAs. However, NHSC alumni and non-alumni in HMSAs continue to evidence differences in practice characteristics which suggest that the NHSC experience has had an impact on practice patterns of alumni. On the other hand, alumni who are practicing in non-HMSAs report practice characteristics that appear very similar to non-alumni in those areas and which are quite different from the practice characteristics of alumni in HMSAs. Two possible explanations are evident for this finding:

1. Alumni who locate in non-HMSAs are different, in some ways, from alumni who practice in HMSAs.

2. Alumni who practice in HMSAs may be continuing in an existing practice and, therefore, continue to have practice characteristics which resemble NHSC practice.

Both these explanations may be accurate, though we have not had an opportunity to fully examine them. It does appear possible that much of the difference in practice characteristics of all alumni and all non-alumni may be explained by the difference in distribution by HMSA location between the two groups.

e. Differences by Region

Table B.9 summarizes the differences in practice characteristics of NHSC alumni and non-alumni by region of the country. The distribution of alumni and non-alumni by region of the country differs to some extent:

	NHSC Alumni	Non-Alumni
North	9%	7%
Central	28%	40%
South	35%	33%
West	28%	19%

Alumni are more heavily concentrated in the West, while non-alumni are concentrated in the Central Region. To the extent that there are differences in practice characteristics of alumni and non-alumni, they may, in part, reflect differences in regional distribution.

Differences in practice patterns by region which are evident in Table B.9 include:

- In the North, both groups of physicians report substantial HMSA practice. However, in the Central region, non-alumni report much lower percentage of HMSA practice. Since non-alumni are disproportionately concentrated in the Central region, this may contribute to the substantial differential observed for this variable.

- The use of NPs and PAs is much higher for both alumni and non-alumni in the Central region, and is also higher than average for alumni in the South.

- Alumni in the North and West see more patients, on average, per week than do non-alumni; however, non-alumni in the South see more patients per week than do alumni.

- Alumni in all regions work slightly more hours per week than do non-alumni; in the West this differential is substantial.

- In all regions, alumni are more likely to offer evening hours to patients than are non-alumni. However, there is not much difference, by region, in the proportion of each group offering weekend office hours.

- In all areas, alumni report higher proportions of Medicaid patients; this differential is greatest in the South.

- In all areas, alumni report that they accept assignment approximately twice as frequently as do non-alumni; the rate is highest for both groups in the North.

- In the Central region, alumni and non-alumni differ much more than other areas on use of sliding scale fee schedules; in the West, non-alumni more frequently report using sliding scales than do alumni.

While some regional differences exist, these do not appear sufficiently large to account for most of the differences observed between alumni and non-alumni, nationally.

f. Discussion

There are differences in the practice characteristics of NHSC alumni and non-alumni. Alumni practice patterns include:

- higher proportions of HMSA patients
- more Community Health Center and Migrant Health Center practice
- greater use of nurse practitioners
- more evening practice hours
- more Medicaid patients
- higher rates of acceptance of assignment for Medicare claims
- more frequent use of sliding fee scales and discounts of fees.

These differences, however, do not appear to be wholly attributable to the NHSC experience. NHSC alumni are somewhat more likely to be in general and family practice, are less frequently board certified, much more likely to practice in an HMSA, and are underrepresented in the South and overrepresented in the West, compared to non-alumni. These differences between the two groups may explain a substantial portion of the practice characteristics differences observed.

It is particularly interesting to note that NHSC alumni who do not practice in HMSAs report practice characteristics that are not different from those of non-alumni who do not practice in HMSAs. In contrast, NHSC alumni in HMSAs so report practice characteristics which are different from those of non-alumni in HMSAs. Evidently, for alumni who remain in HMSA practice, some Corps effect appears to have influenced their subsequent practice patterns.

2. Practice Characteristics of Private Practice Option Physicians

Although the PPO has been increasingly used by physicians, there has been little information available to date on the characteristics of these practices. In this section, data on PPO practice characteristics are summarized.

a. Practice Characteristics of All PPOs

Physicians who repay their NHSC obligation through a PPO arrangement choose among a number of different practice settings (Table B.10). In our sample, this distribution is:

	Number	Percent
All Settings	150	100%
Community Health Center	20	13
Migrant Health Center	4	3
Solo Practice	59	39
Partnership and Other Group Arrangements	63	42
Other Arrangements	4	3

The majority of PPOs (81%) are in solo practice or in some type of group practice arrangements. Only 16 percent are practicing in CHC or MHC settings and 4 percent are in other settings (e.g. State mental hospitals).

The practice characteristics reported by these PPOs differ, by setting:

- Of the 20 PPOs in CHCs, 25 percent report being the only physician present.
- Of the 4 practicing in a Migrant Health Center, 2 also provide services at a CHC.
- The use of NPs and PAs is much higher in CHCs and MHCs; solo practice PPOs report little use of these professionals.
- There is variation in the overall number of patients seen per week from a low of 84 in CHCs to a high of 101 in MHCs. Solo and group practice PPOs report only a small difference in patient loads.
- Hours of work reported by PPOs are much higher than those of other practicing physicians and range from a low of 47 hours per week in "other" settings to a high of 65 hours per week in MHCs.

- o PPOs in CHCs, MHCs, or "other" settings are more likely to offer evening hours than are solo and partnership/group arrangement physicians; however, PPOs in partnership/group arrangement and in "other" settings more frequently report weekend hours.

- o Patients seen by PPOs in MHCs are most likely to have no insurance coverage and PPOs in MHCs report the highest rates of discounts to patients.

b. Differences by Specialty

In Tables B.11 - B.13, data are presented on practice characteristics of PPOs by setting and by specialty. The distribution of PPOs by specialty and setting in this sample is:

Setting	All	GP/FP	IM	PD
All	100.0%	79.0%	13.0%	8.0%
CHC	13.0	15.0	5.0	8.0
MHC	3.0	3.0	0.0	0.0
Solo	39.0	35.0	58.0	50.0
Partnership/Group Arrangements	42.0	45.0	37.0	25.0
Other	3.0	2.0	0.0	17.0

Practice settings differ, to some extent, by specialty with GP/FP physicians more frequently practicing in CHC/MHC settings and in partnership/group arrangements. Internists and pediatricians, on the other hand, more frequently choose solo practice.

Other than these differences in distribution by practice setting, there are only minimal differences in practice characteristics of GP/FPs when compared to all PPOs. Since nearly 80 percent of PPOs are GP/FP physicians, this result is not surprising.

Internal medicine specialists and pediatricians do exhibit some differences in practice characteristics when compared to all PPO respondents:

- o IM specialists

  - -- have smaller HMSA practices
  - -- use no NPs
  - -- see fewer patients
  - -- have more patients in hospitals
  - -- offer weekend hours less frequently

-- charge higher fees
-- have fewer Medicaid patients
-- have more Medicare patients
-- discount their fees more frequently

o Pediatrician PPOs

-- report 100% HMSA practice in all settings
-- use fewer PAs
-- see fewer patients in CHC and solo practice settings
-- offer evening and weekend hours more frequently
-- see more Medicaid patients, particularly in solo practice settings

Although these results are not contrary to any prior conceptions of difference in practice characteristics by specialty, only 19 internists and 12 pediatricians are in our sample and, thus, no conclusions can be drawn from these data.

c. Differences by Board Certification Status

Of 150 PPO respondents, 71 (47%) are board certified (Tables B.14 and B.15). Of these, 17 percent are in CHCs, 4 percent are in MHCs, 32 percent are in solo practice, and 46 percent are in partnership/group arrangements. Thus, board certified physicians are somewhat more likely to be in CHC/MHC settings and in partnership/group arrangements and are less likely to be in solo practice. Board certified physicians, when compared with non-board certified physicians, are not very different. They see a few more patients per week, work slightly more hours, charge slightly higher fees, see fewer Medicaid patients, and give discounts slightly less often, on average. Overall, these differences are very small.

d. Differences by Region of the Country

PPOs in our sample are distributed by region as shown in Table B.16:

	Number	Percent
North	9	6%
Central	46	31%
South	64	43%
West	31	20%

Practice characteristics vary across region:

- In the North, PPOs have

  - -- higher percentages of HMSA patients
  - -- are more likely to be in solo practice
  - -- are much more likely to be in CHC/MHC settings
  - -- use more NPs and PAs
  - -- see fewer patients
  - -- work fewer hours
  - -- have evening hours more frequently, but no weekend hours
  - -- see more Medicaid patients
  - -- give discounts more frequently

- PPOs in the Central region

  - -- are most likely to be in a partnership/group arrangement
  - -- work slightly fewer than the average hours for all PPOs
  - -- are least likely to offer evening hours
  - -- see more Medicare patients and fewer Medicaid patients than the average for all PPOs

- PPOs in the South

  - -- have fewest HMSA patients
  - -- use fewer NPs and PAs than the average
  - -- see slightly fewer patients, on average
  - -- are more likely to offer evening and weekend hours
  - -- see more Medicaid patients

- PPOs in the West

  - -- are disproportionately in solo practice
  - -- see the most patients per week, on average
  - -- charge the highest fees
  - -- see the fewest Medicare and Medicaid patients

Although differences by region are observed, it is unclear what interpretation of these differences is appropriate, since no adjustment for setting or specialty distribution has been made in this analysis.

e. Summary

The description of PPOs practices provides information which may be of use in future NHSC placements. The results indicate that:

- The majority of PPOs are in solo and partnership/group practice arrangements.

- PPOs see fewer patients, on average, than do NHSC alumni and non-alumni, but report working more hours.

- About 20 percent of patients seen in all settings are Medicaid beneficiaries.

- PPOs in MHCs see the largest number of patients and work the longest hours.

- Nearly 80 percent of PPOs are GP/FP physicians; although IM and PD physicians report differing practice characteristics, they are a very small fraction of respondents.

- There is little difference between board certified and non-board certified physicians in practice characteristics.

- Although regional differences in practice characteristics are evident, it is unclear to what extent these may be due to differences in distribution of PPOs by setting and specialty.

TABLE B.1
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, ALL RESPONDENTS

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	277.00	202.00	700.00	609.00	91.00
PRACNUM	1.30	1.30	1.14	1.14	1.15
PCTHMSA	78.94	77.15	48.12	48.66	44.51
SOLO	0.37	0.36	0.32	0.29	0.49
GROUP	0.26	0.26	0.38	0.41	0.19
COMMUN	0.26	0.26	0.05	0.05	0.06
MIGRANT	0.03	0.02	0.00	0.00	0.00
TIMEPRAC	3.97	4.04	4.47	4.34	5.29
AGEPRAC	10.20	10.10	14.16	14.31	13.15
FTEMDS	2.46	2.63	3.51	3.58	3.06
NPS	0.46	0.40	0.15	0.15	0.15
PAS	0.25	0.24	0.24	0.22	0.33
PATIENTS	101.13	99.71	105.40	103.26	119.81
NEWPATS	14.55	14.88	11.55	11.20	13.90
ACCEPT	0.99	0.99	0.99	0.99	0.99
HOSPATS	7.26	7.61	7.30	7.29	7.35
HRSWEEK	37.92	38.05	35.81	35.31	39.26
PTHRS	33.77	33.37	33.44	32.94	36.71
PERHOURS	4.39	4.12	4.80	4.77	5.01
TELPATS	6.65	6.44	7.60	7.78	6.37
WKSWORK	47.15	47.03	47.85	47.99	46.95
EVENING	0.30	0.31	0.15	0.16	0.15
WEEKEND	0.40	0.42	0.39	0.38	0.44
FEENEW	27.90	28.09	30.18	30.55	27.79
FEEFOFF	17.59	17.71	18.16	18.17	18.12
FEEHOSP	23.17	23.44	24.21	23.81	26.86
PCTBLUE	18.41	18.27	23.84	23.80	24.08
PCTPRIV	25.45	26.05	29.15	29.14	29.22
MEDICARE	29.85	30.30	30.59	29.91	35.01
MEDICAID	20.63	21.35	14.35	14.06	16.24
NOINS	24.75	23.74	22.99	22.59	25.52
ASSIGN	0.50	0.50	0.28	0.26	0.38
NEWMED	0.92	0.92	0.84	0.84	0.80
SLIDE	0.38	0.37	0.32	0.33	0.25
DISCT	13.47	14.18	9.77	9.75	9.92
COLLRAT	2.91	2.96	2.55	2.50	2.83

TABLE B.2
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, GENERAL AND FAMILY
PRACTICE PHYSICIANS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	213.00	154.00	496.00	411.00	85.00
PRACNUM	1.31	1.31	1.16	1.17	1.14
PCTHMSA	78.79	77.27	49.36	50.57	43.53
SOLO	0.37	0.38	0.35	0.32	0.52
GROUP	0.24	0.23	0.37	0.41	0.15
COMMUN	0.25	0.25	0.05	0.05	0.06
MIGRANT	0.02	0.02	0.00	0.00	0.00
TIMEPRAC	3.95	3.96	4.70	4.54	5.47
AGEPRAC	10.48	10.24	14.60	15.07	12.33
FTEMDS	2.10	2.23	2.91	2.99	2.50
NPS	0.52	0.46	0.11	0.12	0.05
PAS	0.23	0.20	0.21	0.22	0.21
PATIENTS	106.26	104.40	114.50	112.73	123.13
NEWPATS	15.46	15.94	12.25	11.91	13.88
ACCEPT	0.99	0.99	0.99	0.99	0.99
HOSPATS	6.71	7.19	6.85	6.87	6.73
HRSWEEK	38.48	38.62	36.92	36.24	40.29
PTHRS	34.62	34.29	34.07	33.65	36.11
PERHOURS	4.56	4.22	4.98	4.95	5.11
TELPATS	6.54	6.25	7.61	7.85	6.46
WKSWORK	47.06	46.88	48.01	48.12	47.45
EVENING	0.29	0.29	0.16	0.16	0.14
WEEKEND	0.40	0.42	0.42	0.41	0.46
FEENEW	25.37	26.40	24.70	24.50	25.67
FEEFOFF	17.27	17.51	17.54	17.44	18.01
FEEHOSP	22.36	22.57	23.33	22.70	26.36
PCTBLUE	17.75	17.42	23.38	23.42	23.21
PCTPRIV	26.23	27.39	29.06	29.01	29.30
MEDICARE	30.17	31.52	28.79	27.67	34.05
MEDICAID	20.16	20.27	15.01	14.72	16.36
NOINS	26.09	24.43	24.73	24.30	26.76
ASSIGN	0.54	0.54	0.29	0.27	0.37
NEWMED	0.93	0.92	0.83	0.84	0.80
SLIDE	0.38	0.37	0.31	0.33	0.24
DISCT	12.98	13.72	9.41	9.43	9.31
COLLRAT	2.89	2.93	2.55	2.50	2.78

TABLE B.3
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, INTERNAL MEDICINE
PHYSICIANS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	42.00	31.00	142.00	137.00	5.00
PRACNUM	1.24	1.23	1.09	1.08	1.40
PCTHMSA	77.38	72.58	51.06	51.09	50.00
SOLO	0.32	0.19	0.29	0.29	0.20
GROUP	0.37	0.48	0.38	0.37	0.60
COMMUN	0.26	0.26	0.04	0.04	0.00
MIGRANT	0.05	0.03	0.00	0.00	0.00
TIMEPRAC	4.04	4.46	3.70	3.74	2.55
AGEPRAC	10.16	11.51	12.54	12.43	15.38
FTEMDS	4.48	5.56	4.83	4.71	8.20
NPS	0.36	0.31	0.23	0.20	1.00
PAS	0.33	0.39	0.33	0.27	2.00
PATIENTS	76.18	78.50	73.16	73.50	64.00
NEWPATS	10.41	9.61	9.61	9.41	15.00
ACCEPT	1.00	1.00	0.98	0.98	1.00
HOSPATS	9.93	9.67	8.53	8.16	18.40
HRSWEEK	34.69	35.19	31.53	31.88	22.00
PTHRS	30.33	30.26	31.23	30.66	46.80
PERHOURS	3.55	3.58	4.31	4.34	3.60
TELPATS	5.76	5.68	6.96	7.07	4.20
WKSWORK	47.21	47.29	47.37	47.68	37.25
EVENING	0.29	0.35	0.11	0.10	0.40
WEEKEND	0.20	0.23	0.23	0.23	0.20
FEENEW	44.58	40.32	51.15	50.97	56.00
FEEFOFF	19.31	19.07	21.04	21.13	18.60
FEEHOSP	26.19	27.50	26.36	26.25	29.00
PCTBLUE	20.16	22.64	25.86	25.73	29.00
PCTPRIV	19.89	20.69	29.28	29.19	31.60
MEDICARE	43.46	40.86	50.23	49.93	58.00
MEDICAID	14.50	16.50	10.82	10.73	13.40
NOINS	19.62	19.10	15.26	15.61	7.00
ASSIGN	0.45	0.45	0.28	0.27	0.60
NEWMED	0.88	0.93	0.84	0.84	0.80
SLIDE	0.43	0.45	0.35	0.35	0.50
DISCT	17.50	18.04	11.15	10.74	22.00
COLLRAT	3.05	3.10	2.54	2.49	3.80

TABLE B.4
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, PEDIATRICIANS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	22.00	17.00	62.00	61.00	1.00
PRACNUM	1.27	1.35	1.13	1.13	1.00
PCTHMSA	83.33	84.31	31.45	30.33	100.00
SOLO	0.50	0.59	0.15	0.15	0.00
GROUP	0.27	0.18	0.48	0.48	1.00
COMMUN	0.27	0.29	0.08	0.08	0.00
MIGRANT	0.00	0.00	0.02	0.02	0.00
TIMEPRAC	3.94	3.93	4.34	4.34	4.33
AGEPRAC	7.61	6.29	14.31	13.40	70.00
FTEMDS	2.07	0.85	5.29	5.00	23.00
NPS	0.05	0.06	0.23	0.17	4.00
PAS	0.27	0.29	0.20	0.17	2.00
PATIENTS	96.64	93.29	106.82	106.61	120.00
NEWPATS	13.42	14.53	10.56	10.57	10.00
ACCEPT	1.00	1.00	1.00	1.00	1.00
HOSPATS	7.45	7.71	8.15	8.20	5.00
HRSWEEK	38.77	38.12	36.74	36.69	40.00
PTHRS	32.14	30.76	33.42	33.34	38.00
PERHOURS	4.36	4.24	4.55	4.56	4.00
TELPATS	9.50	9.47	8.97	8.95	10.00
WKSWORK	47.95	47.88	47.71	47.75	45.00
EVENING	0.45	0.41	0.23	0.23	0.00
WEEKEND	0.82	0.82	0.52	0.53	0.00
FEENEW	25.24	23.75	26.09	25.39	65.00
FEEFOFF	17.76	17.13	16.40	16.25	25.00
FEEHOSP	25.42	24.07	26.22	25.69	55.00
PCTBLUE	21.00	17.33	23.02	22.16	70.00
PCTPRIV	28.45	23.93	29.57	29.93	10.00
MEDICARE	0.10	0.13	1.15	1.16	0.00
MEDICAID	37.70	40.56	17.06	17.02	20.00
NOINS	22.62	26.56	26.10	26.21	20.00
ASSIGN	0.16	0.19	0.21	0.22	0.00
NEWMED	0.86	0.88	0.88	0.88	1.00
SLIDE	0.26	0.27	0.29	0.29	0.00
DISCT	10.05	10.87	9.43	9.60	0.00
COLLRAT	2.90	3.00	2.57	2.58	2.00

TABLE B.5
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, BOARD CERTIFIED
PHYSICIANS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	164.00	120.00	523.00	509.00	14.00
PRACNUM	1.33	1.33	1.14	1.14	1.07
PCTHMSA	79.47	76.53	46.75	46.76	46.43
SOLO	0.31	0.30	0.27	0.26	0.43
GROUP	0.32	0.33	0.45	0.45	0.36
COMMUN	0.26	0.28	0.05	0.05	0.00
MIGRANT	0.04	0.03	0.01	0.01	0.00
TIMEPRAC	3.76	3.92	4.19	4.19	4.15
AGEPRAC	10.74	10.80	14.70	14.65	16.42
FTEMDS	2.97	3.25	3.97	3.88	7.29
NPS	0.44	0.55	0.17	0.15	0.75
PAS	0.27	0.26	0.27	0.25	1.18
PATIENTS	96.06	96.82	103.09	103.42	91.14
NEWPATS	11.37	10.69	11.14	11.04	14.71
ACCEPT	0.99	0.98	0.99	0.99	1.00
HOSPATS	8.02	8.44	7.40	7.31	10.50
HRSWEEK	36.79	36.88	35.27	35.33	33.07
PTHRS	32.49	32.07	32.87	32.73	37.86
PERHOURS	4.20	4.22	4.77	4.78	4.43
TELPATS	6.93	6.77	7.82	7.87	6.07
WKSWORK	46.95	46.58	47.80	47.96	41.69
EVENING	0.31	0.32	0.16	0.16	0.21
WEEKEND	0.44	0.44	0.39	0.39	0.36
FEENEW	28.85	29.15	30.66	30.51	35.86
FEEFOFF	17.92	17.84	18.12	18.15	17.00
FEEHOSP	24.21	24.85	23.81	23.69	28.15
PCTBLUE	18.57	19.14	24.09	24.02	26.29
PCTPRIV	26.04	25.57	28.53	28.55	27.86
MEDICARE	29.65	30.82	29.29	29.14	34.50
MEDICAID	20.96	22.15	13.79	13.75	15.00
NOINS	25.00	23.93	23.01	23.00	23.36
ASSIGN	0.47	0.47	0.26	0.25	0.50
NEWMED	0.91	0.92	0.85	0.85	0.79
SLIDE	0.37	0.34	0.31	0.31	0.25
DISCT	14.10	14.63	9.79	9.57	17.43
COLLRAT	2.91	2.92	2.49	2.48	2.86

TABLE B.6
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF NHSC AND NON-NHSC PHYSICIANS, NON-BOARD CERTIFIED PHYSICIANS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	111.00	80.00	173.00	97.00	76.00
PRACNUM	1.26	1.26	1.16	1.15	1.16
PCTHMSA	77.78	77.50	52.50	59.11	44.08
SOLO	0.45	0.46	0.47	0.45	0.50
GROUP	0.18	0.18	0.19	0.22	0.16
COMMUN	0.25	0.24	0.06	0.05	0.07
MIGRANT	0.01	0.01	0.00	0.00	0.00
TIMEPRAC	4.24	4.16	5.33	5.21	5.48
AGEPRAC	9.47	9.14	12.80	12.93	12.61
FTEMDS	1.75	1.76	2.15	2.06	2.26
NPS	0.50	0.21	0.08	0.11	0.03
PAS	0.20	0.20	0.14	0.12	0.17
PATIENTS	108.71	104.25	112.69	103.62	124.43
NEWPATS	19.36	21.42	12.83	12.22	13.59
ACCEPT	1.00	1.00	0.99	0.99	0.99
HOSPATS	6.11	6.36	6.80	7.06	6.47
HRSWEEK	39.75	40.03	37.33	35.38	39.88
PTHRS	35.86	35.60	35.05	34.25	36.07
PERHOURS	4.67	3.97	4.89	4.72	5.11
TELPATS	6.24	5.91	6.92	7.34	6.38
WKSWORK	47.46	47.72	47.99	48.13	47.81
EVENING	0.30	0.30	0.13	0.14	0.13
WEEKEND	0.36	0.41	0.39	0.34	0.45
FEENEW	26.58	26.59	28.62	30.45	26.39
FEEFOFF	17.11	17.50	18.22	18.11	18.36
FEEHOSP	21.70	21.39	25.26	24.05	26.64
PCTBLUE	18.13	16.89	23.01	22.44	23.64
PCTPRIV	24.61	26.89	30.26	31.57	28.85
MEDICARE	29.87	29.09	34.04	33.44	34.77
MEDICAID	19.87	19.78	15.96	16.03	15.88
NOINS	24.41	23.49	23.15	20.53	26.17
ASSIGN	0.53	0.54	0.33	0.32	0.35
NEWMED	0.94	0.92	0.80	0.80	0.80
SLIDE	0.40	0.43	0.35	0.41	0.26
DISCT	12.65	13.69	9.71	10.69	8.50
COLLRAT	2.91	3.01	2.72	2.64	2.81

TABLE B.7
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, HMSA LOCATIONS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	116.00	85.00	118.00	101.00	17.00
PRACNUM	1.28	1.29	1.14	1.14	1.12
PCTHMSA	96.98	98.24	97.03	97.03	97.06
SOLO	0.45	0.45	0.49	0.48	0.53
GROUP	0.20	0.19	0.19	0.21	0.06
COMMUN	0.29	0.32	0.06	0.06	0.06
MIGRANT	0.05	0.05	0.01	0.01	0.00
TIMEPRAC	4.45	4.49	4.58	4.44	5.39
AGEPRAC	8.28	7.74	10.44	9.79	14.56
FTEMDS	1.98	2.24	1.85	1.45	4.21
NPS	0.54	0.32	0.08	0.08	0.06
PAS	0.30	0.33	0.12	0.13	0.12
PATIENTS	101.00	97.87	115.74	110.89	144.53
NEWPATS	12.33	13.04	14.65	14.45	15.76
ACCEPT	0.99	0.99	0.99	0.99	1.00
HOSPATS	7.52	8.27	7.27	7.37	6.71
HRSWEEK	37.23	38.19	37.29	37.10	38.50
PTHRS	33.63	33.94	35.14	34.91	36.47
PERHOURS	4.75	4.18	4.91	4.71	6.06
TELPATS	6.05	5.93	6.70	7.12	4.24
WKSWORK	47.87	47.54	47.70	48.21	44.56
EVENING	0.30	0.34	0.23	0.23	0.24
WEEKEND	0.41	0.44	0.37	0.35	0.47
FEENEW	24.84	24.75	27.61	26.27	35.47
FEEFOFF	16.57	16.49	18.03	17.11	23.29
FEEHOSP	21.51	21.70	24.32	22.43	34.94
PCTBLUE	15.17	14.75	19.52	19.80	17.80
PCTPRIV	22.93	23.42	28.83	28.61	30.13
MEDICARE	30.13	29.68	31.98	31.58	34.50
MEDICAID	22.77	22.87	17.68	17.15	21.00
NOINS	26.09	25.57	24.43	24.85	21.80
ASSIGN	0.60	0.60	0.36	0.36	0.38
NEWMED	0.92	0.90	0.88	0.87	0.94
SLIDE	0.47	0.47	0.37	0.39	0.27
DISCT	15.48	17.60	12.39	12.79	10.12
COLLRAT	3.11	3.19	2.84	2.84	2.88

*Physicians located in part-HMSAs where excluded from the analysis.

TABLE B.8
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
NHSC AND NON-NHSC PHYSICIANS, RURAL NON-HMSA LOCATIONS ONLY

	NHSC		NON-NHSC		
Characteristics	ALL	MD's	ALL	MD's	DO's
TOTAL NUMBER	56.00	45.00	360 00	309.00	51.00
PRACNUM	1.30	1.29	1.12	1.12	1.14
PCTHMSA	5.95	5.56	1.57	1.35	2.94
SOLO	0.30	0.24	0.30	0.25	0.55
GROUP	0.34	0.38	0.42	0.46	0.16
COMMUN	0.09	0.09	0.05	0.05	0.06
MIGRANT	0.00	0.00	0.01	0.01	0.00
TIMEPRAC	3.18	3.22	4.60	4.45	5.49
AGEPRAC	11.15	12.86	14.44	14.85	11.97
FTEMDS	2.43	2.62	3.84	4.15	1.90
NPS	0.10	0.09	0.13	0.14	0.05
PAS	0.17	0.19	0.25	0.27	0.11
PATIENTS	104.78	103.48	107.99	106.44	117.56
NEWPATS	20.26	20.14	11.53	11.34	12.71
ACCEPT	0.98	0.98	0.99	0.99	0.98
HOSPATS	8.25	8.22	7.96	7.97	7.90
HRSWEEK	41.86	41.13	36.15	35.70	38.84
PTHRS	35.52	34.89	33.65	33.11	36.86
PERHOURS	4.27	4.27	4.84	4.84	4.80
TELPATS	6.63	6.44	7.91	8.03	7.20
WKSWORK	47.54	47.40	48.32	48.14	49.42
EVENING	0.24	0.27	0.14	0.14	0.12
WEEKEND	0.55	0.59	0.40	0.39	0.47
FEENEW	30.51	30.37	30.79	32.01	23.62
FEEFOFF	18.77	19.08	17.95	18.18	16.60
FEEHOSP	23.37	24.72	24.22	24.36	23.43
PCTBLUE	23.81	22.05	24.22	24.25	24.08
PCTPRIV	27.46	28.05	30.06	30.36	28.37
MEDICARE	29.91	29.88	28.83	27.89	34.32
MEDICAID	14.46	14.79	12.74	12.57	13.72
NOINS	20.18	20.33	23.59	22.56	29.38
ASSIGN	0.27	0.32	0.27	0.26	0.32
NEWMED	0.89	0.90	0.80	0.81	0.73
SLIDE	0.30	0.30	0.29	0.30	0.17
DISCT	10.84	11.71	9.19	9.00	10.28
COLLRAT	2.65	2.67	2.47	2.41	2.83

TABLE B.9

COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF NHSC AND NON-NHSC PHYSICIANS, REGION OF THE COUNTRY

Characteristics	NORTHERN		CENTRAL		SOUTHERN		WESTERN	
	NON-NHSC PHYSICIANS	NHSC ALUMNI	NON-NHSC PHYSICIANS	NHSC ALUMNI	NON-NHSC PHYSICIANS	NHSC ALUMNI	NON-NHSC PHYSICIANS	NHSC ALUMNI
TOTAL NUMBER	52.00	25.00	283.00	77.00	234.00	98.00	131.00	77.00
PRACNUM	1.23	1.24	1.17	1.47	1.10	1.16	1.14	1.32
PCTHMSA	88.46	96.00	39.34	76.41	46.37	76.02	54.20	79.65
SOLO	0.38	0.33	0.23	0.38	0.39	0.36	0.36	0.38
GROUP	0.31	0.21	0.49	0.28	0.30	0.23	0.31	0.32
COMMUN	0.06	0.40	0.06	0.25	0.05	0.29	0.02	0.18
MIGRANT	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.07
TIMEPRAC	4.04	3.66	4.46	4.54	4.71	3.94	4.19	3.49
AGEPRAC	9.32	11.47	18.30	11.92	11.65	9.02	11.69	9.54
FTEMDS	2.15	1.74	5.00	1.97	2.00	2.62	3.56	2.98
NPS	0.19	0.18	0.19	0.61	0.06	0.61	0.17	0.20
PAS	0.15	0.16	0.34	0.24	0.15	0.25	0.20	0.27
PATIENTS	81.59	111.21	106.45	104.96	117.94	94.64	89.95	102.25
NEWPATS	7.59	12.50	9.64	10.92	13.19	15.41	14.38	18.06
ACCEPT	0.96	1.00	1.00	0.99	0.99	0.99	0.98	1.00
HOSPATS	5.37	8.12	7.26	7.04	8.81	7.24	5.44	7.22
HRSWEEK	33.10	34.52	35.23	36.31	36.75	37.56	36.45	41.14
PTHRS	29.87	30.64	31.91	32.69	36.38	32.44	32.87	37.56
PERHOURS	3.98	4.28	5.22	4.54	4.90	4.74	4.05	3.83
TELPATS	7.87	10.80	7.65	6.32	7.61	6.32	7.37	6.06
WKSWORK	48.08	47.40	47.66	47.61	48.36	47.23	47.29	46.51
EVENING	0.20	0.67	0.14	0.35	0.15	0.21	0.18	0.25
WEEKEND	0.16	0.33	0.46	0.43	0.37	0.44	0.35	0.36
FEENEW	32.92	25.55	27.41	24.30	30.75	29.19	34.19	30.37
FEEFOFF	18.74	17.91	16.96	16.62	18.73	17.33	19.60	18.80
FEEHOSP	23.96	22.35	22.82	23.09	25.23	23.47	25.61	23.13
PCTBLUE	32.81	29.78	26.43	18.79	21.67	14.88	18.66	18.58
PCTPRIV	18.68	18.77	27.44	27.00	30.20	21.72	34.79	30.94
MEDICARE	36.18	31.13	29.67	32.89	33.68	28.74	24.98	27.90
MEDICAID	15.30	20.25	14.22	19.36	15.34	23.88	12.49	17.67
NOINS	19.38	23.27	22.53	21.05	24.26	27.38	23.20	25.07
ASSIGN	0.34	0.71	0.29	0.47	0.25	0.46	0.27	0.52
NEWMED	0.92	0.88	0.86	0.93	0.78	0.94	0.84	0.89
SLIDE	0.31	0.32	0.26	0.50	0.34	0.34	0.41	0.33
DISCT	8.36	8.88	8.36	10.97	11.27	17.11	10.70	13.02
COLLRAT	2.64	2.68	2.36	2.57	2.72	3.15	2.62	3.04

TABLE B.10
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPO PHYSICIANS

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	150.00	20.00	4.00	59.00	63.00	4.00
PRACNUM	1.23	1.50	1.25	1.10	1.27	1.25
PCTHMSA	93.00	97.50	100.00	95.76	89.68	75.00
SOLO	0.43	0.25	0.00	1.00	0.00	0.00
GROUP	0.53	0.70	0.75	0.00	1.00	0.00
COMMUN	0.15	1.00	0.50	0.00	0.00	0.00
MIGRANT	0.03	0.00	1.00	0.00	0.00	0.00
TIMEPRAC	2.12	1.63	2.50	2.20	2.21	1.46
AGEPRAC	8.60	9.99	5.94	4.71	12.14	6.17
FTEMDS	1.37	1.77	2.63	0.53	1.90	2.00
NPS	0.07	0.22	0.25	0.03	0.06	0.00
PAS	0.22	0.47	0.75	0.07	0.24	0.25
PATIENTS	93.79	83.55	101.25	97.97	92.43	98.33
NEWPATS	13.33	11.00	10.25	14.54	13.08	13.33
ACCEPT	1.00	1.00	1.00	1.00	1.00	1.00
HOSPATS	5.97	4.15	6.67	5.83	6.84	3.00
PTHRS	52.10	48.50	65.00	54.02	51.12	47.00
PERHOURS	4.14	3.63	4.33	4.11	4.44	2.25
TELPATS	6.68	6.30	6.67	6.86	6.55	8.00
EVENING	0.27	0.40	0.33	0.29	0.18	0.75
WEEKEND	0.36	0.30	0.33	0.24	0.48	0.75
FEENEW	25.97	25.15	22.00	27.91	24.82	20.00
FEEFOFF	16.47	16.30	16.50	16.56	16.77	9.67
FEEHOSP	22.25	20.63	17.50	23.64	22.17	10.33
PCTBLUE	18.79	23.59	7.50	16.85	20.13	7.33
PCTPRIV	24.47	20.06	8.67	27.43	23.17	36.33
MEDICARE	31.71	29.42	18.75	30.83	34.66	20.00
MEDICAID	20.32	22.84	19.50	19.51	19.98	28.33
NOINS	23.12	20.44	39.33	21.59	23.92	34.67
DISCT	14.06	14.84	43.75	14.55	10.76	30.00
COLLRAT	3.05	2.95	3.33	3.09	3.00	3.67

TABLE B.11
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPOS, GENERAL AND FAMILY PRACTICE PHYSICIANS ONLY

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	119.00	18.00	4.00	42.00	53.00	2.00
PRACNUM	1.24	1.44	1.25	1.07	1.28	1.50
PCTHMSA	93.28	97.22	100.00	95.24	91.51	50.00
SOLO	0.39	0.22	0.00	1.00	0.00	0.00
GROUP	0.58	0.72	0.75	0.00	1.00	0.00
COMMUN	0.17	1.00	0.50	0.00	0.00	0.00
MIGRANT	0.03	0.00	1.00	0.00	0.00	0.00
TIMEPRAC	2.12	1.57	2.50	2.14	2.30	1.33
AGEPRAC	9.26	10.69	5.94	5.39	12.12	10.00
FTEMDS	1.45	1.69	2.63	0.70	1.80	3.00
NPS	0.08	0.25	0.25	0.04	0.06	0.00
PAS	0.23	0.47	0.75	0.07	0.23	0.00
PATIENTS	98.08	87.28	101.25	108.29	94.42	45.00
NEWPATS	14.06	11.65	10.25	15.88	13.44	25.00
ACCEPT	1.00	1.00	1.00	1.00	1.00	1.00
HOSPATS	5.49	4.39	6.67	5.62	5.90	0.00
PTHRS	52.60	48.61	65.00	53.73	51.50	74.00
PERHOURS	4.18	3.59	4.33	4.38	4.33	1.50
TELPATS	6.32	6.17	6.67	6.31	6.50	2.50
EVENING	0.26	0.39	0.33	0.29	0.17	1.00
WEEKEND	0.37	0.33	0.33	0.24	0.47	1.00
FEENEW	23.32	25.61	22.00	23.44	22.92	0.00
FEEFOPF	15.72	16.28	16.50	15.45	16.02	0.00
FEEHOSP	21.71	22.50	17.50	23.67	20.56	0.00
PCTBLUE	17.94	24.73	7.50	15.70	18.26	10.00
PCTPRIV	22.35	18.40	8.67	26.42	21.34	10.00
MEDICARE	31.16	32.29	18.75	29.21	33.54	20.00
MEDICAID	20.75	24.06	19.50	18.02	21.68	35.00
NOINS	24.54	20.50	39.33	23.21	25.98	25.00
DISCT	13.34	15.12	43.75	13.50	10.04	20.00
COLLRAT	3.00	3.00	3.33	3.02	2.96	3.00

TABLE B.12
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPGS, INTERNAL MEDICINE PHYSICIANS ONLY

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	19.00	1.00	*	11.00	7.00	*
PRACNUM	1.16	1.00		1.27	1.00	
PCTHMSA	86.84	100.00		95.45	71.43	
SOLO	0.63	1.00		1.00	0.00	
GROUP	0.37	0.00		0.00	1.00	
COMMUN	0.05	1.00		0.00	0.00	
MIGRANT	0.00	0.00		0.00	0.00	
TIMEPRAC	1.99	3.25		2.19	1.49	
AGEPRAC	7.30	3.25		3.37	14.05	
FTEMDS	1.00	0.00		0.09	2.57	
NPS	0.00	0.00		0.00	0.00	
PAS	0.26	1.00		0.09	0.43	
PATIENTS	72.37	80.00		71.45	72.71	
NEWPATS	10.50	5.00		10.64	11.17	
ACCEPT	1.00	1.00		1.00	1.00	
HOSPATS	9.95	0.00		7.55	15.14	
PTHRS	52.89	50.00		54.64	50.17	
PERHOURS	4.21	4.00		3.36	5.57	
TELPATS	7.16	10.00		7.82	5.71	
EVENING	0.28	1.00		0.27	0.17	
WEEKEND	0.28	0.00		0.27	0.33	
FEENEW	42.42	23.00		46.91	38.14	
FEEFOFF	20.58	18.00		20.18	21.57	
FEEHOSP	23.83	0.00		21.90	30.00	
PCTBLUE	26.59	5.00		23.00	34.29	
PCTPRIV	32.33	25.00		37.90	25.43	
MEDICARE	50.63	10.00		53.36	52.14	
MEDICAID	13.89	0.00		18.55	8.57	
NOINS	14.24	20.00		13.60	14.33	
DISCT	18.50	15.00		18.91	18.33	
COLLRAT	3.06	1.00		3.20	3.17	

* NO RESPONDENTS IN THIS CATEGORY

TABLE B.13
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPOS, PEDIATRICIANS ONLY

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	12.00	1.00	*	6.00	3.00	2.00
PRACNUM	1.33	3.00		1.00	1.67	1.00
PCTHMSA	100.00	100.00		100.00	100.00	100.00
SOLO	0.50	0.00		1.00	0.00	0.00
GROUP	0.33	1.00		0.00	1.00	0.00
COMMUN	0.08	1.00		0.00	0.00	0.00
MIGRANT	0.00	0.00		0.00	0.00	0.00
TIMEPRAC	2.26	1.17		2.67	2.25	1.58
AGEPRAC	4.22	4.00		2.42	7.86	4.25
FTEMDS	1.21	5.00		0.17	2.17	1.00
NPS	0.08	0.00		0.00	0.33	0.00
PAS	0.08	0.00		0.00	0.00	0.50
PATIENTS	85.50	20.00		74.33	103.33	125.00
NEWPATS	10.67	6.00		12.33	11.00	7.50
ACCEPT	1.00	1.00		1.00	1.00	1.00
HOSPATS	4.33	4.00		4.17	3.67	6.00
PTHRS	46.17	45.00		54.83	46.67	20.00
PERHOURS	3.55	4.00		3.60	3.67	3.00
TELPATS	9.50	5.00		9.00	9.33	13.50
EVENING	0.33	0.00		0.33	0.33	0.50
WEEKEND	0.42	0.00		0.17	1.00	0.50
FEENEW	24.92	19.00		23.67	26.00	30.00
FEEFOFF	16.92	15.00		17.33	18.33	14.50
FEEHOSP	24.67	15.00		26.33	30.67	15.50
PCTBLUE	15.18	25.00		15.00	18.33	6.00
PCTPRIV	32.00	40.00		16.67	48.33	49.50
MEDICARE	7.08	0.00		0.83	13.33	20.00
MEDICAID	26.25	25.00		31.67	16.67	25.00
NOINS	22.73	20.00		25.00	8.67	39.50
DISCT	14.20	10.00		13.80	7.67	40.00
COLLRAT	3.50	4.00		3.33	3.33	4.00

* NO RESPONDENTS IN THIS CATEGORY

TABLE B.14
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPOS, BOARD CERTIFIED PHYSICIANS ONLY

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	71.00	12.00	3.00	23.00	33.00	*
PRACNUM	1.30	1.58	1.33	1.09	1.33	
PCTHMSA	95.77	100.00	100.00	95.65	93.94	
SOLO	0.37	0.25	0.00	1.00	0.00	
GROUP	0.61	0.67	0.67	0.00	1.00	
COMMUN	0.20	1.00	0.67	0.00	0.00	
MIGRANT	0.04	0.00	1.00	0.00	0.00	
TIMEPRAC	2.25	1.62	2.58	2.53	2.25	
AGEPRAC	9.58	6.19	7.08	5.31	14.01	
FTEMDS	1.73	1.83	3.17	0.89	2.14	
NPS	0.06	0.21	0.00	0.00	0.06	
PAS	0.32	0.33	1.00	0.09	0.30	
PATIENTS	95.77	82.50	93.33	103.00	95.79	
NEWPATS	12.88	10.00	7.00	16.87	11.61	
ACCEPT	1.00	1.00	1.00	1.00	1.00	
HOSPATS	6.39	3.67	7.00	6.13	7.52	
PTHRS	53.51	49.50	60.00	55.59	53.16	
PERHOURS	4.28	3.58	5.00	4.05	4.64	
TELPATS	6.89	6.67	5.00	7.35	6.76	
EVENING	0.23	0.42	0.50	0.30	0.09	
WEEKEND	0.34	0.33	0.00	0.30	0.39	
FEENEW	27.74	27.00	22.00	30.95	26.03	
FEEFOFF	17.15	16.67	15.00	17.45	17.18	
FEEHOSP	23.00	23.67	15.00	23.38	22.82	
PCTBLUE	20.97	23.40	7.50	20.89	21.09	
PCTPRIV	23.48	21.70	6.00	26.75	23.09	
MEDICARE	30.00	26.50	23.33	30.70	31.39	
MEDICAID	16.27	22.42	20.00	12.00	16.67	
NOINS	21.17	22.27	27.50	17.85	22.52	
DISCT	12.32	16.83	38.33	8.18	11.03	
COLLRAT	2.82	2.83	3.00	2.95	2.72	

* NO RESPONDENTS IN THIS CATEGORY

TABLE B.15
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPOS, NON-BOARD CERTIFIED PHYSICIANS ONLY

Characteristics	ALL SETTINGS	COMMUNITY HEALTH CENTER	MIGRANT HEALTH CENTER	SOLO PRACTICE	PARTNERSHIP/ GROUP ARRANGEMENTS	OTHER
TOTAL NUMBER	79.00	8.00	1.00	36.00	30.00	4.00
PRACNUM	1.18	1.38	1.00	1.11	1.20	1.25
PCTHMSA	90.51	93.75	100.00	95.83	85.00	75.00
SOLO	0.48	0.25	0.00	1.00	0.00	0.00
GROUP	0.47	0.75	1.00	0.00	1.00	0.00
COMMUN	0.10	1.00	0.00	0.00	0.00	0.00
MIGRANT	0.01	0.00	1.00	0.00	0.00	0.00
TIMEPRAC	2.00	1.66	2.25	1.99	2.16	1.46
AGEPRAC	7.69	15.68	2.50	4.33	10.00	6.17
FTEMDS	1.05	1.69	1.00	0.29	1.65	2.00
NPS	0.08	0.25	1.00	0.04	0.07	0.00
PAS	0.13	0.25	0.00	0.06	0.17	0.25
PATIENTS	91.97	85.13	125.00	94.75	88.73	98.33
NEWPATS	13.75	12.71	20.00	13.06	14.71	13.33
ACCEPT	1.00	1.00	1.00	1.00	1.00	1.00
HOSPATS	5.59	4.88	6.00	5.64	6.07	3.00
PTHRS	50.87	47.00	75.00	53.06	48.86	47.00
PERHOURS	4.01	3.71	3.00	4.15	4.21	2.25
TELPATS	6.50	5.75	10.00	6.56	6.31	8.00
EVENING	0.31	0.38	0.00	0.28	0.28	0.75
WEEKEND	0.38	0.25	1.00	0.19	0.59	0.75
FEENEW	24.39	22.38	22.00	26.06	23.39	20.00
FEEFOFF	15.85	15.75	18.00	16.00	16.29	9.67
FEEHOSP	21.58	16.71	20.00	23.79	21.37	10.33
PCTBLUE	16.97	23.86		14.83	19.04	7.33
PCTPRIV	25.32	17.71	14.00	27.81	23.25	36.33
MEDICARE	33.32	34.43	5.00	30.92	38.38	20.00
MEDICAID	24.05	23.57	18.00	24.31	23.63	28.33
NOINS	24.82	17.57	63.00	23.79	25.46	34.67
DISCT	15.70	11.43	60.00	18.44	10.44	30.00
COLLRAT	3.25	3.13	4.00	3.17	3.31	3.67

TABLE B.16
COMPARISON OF MEANS OF PRACTICE CHARACTERISTICS OF
RECENT PPOs, BY REGION

	ALL PPO's	NORTHERN	CENTRAL	SOUTHERN	WESTERN
TOTAL NUMBER	150.00	9.00	46.00	64.00	31.00
PRACNUM	1.23	1.11	1.35	1.16	1.26
PCTHMSA	93.00	100.00	93.48	89.84	96.77
SOLO	0.43	0.56	0.30	0.44	0.55
GROUP	0.53	0.22	0.67	0.53	0.42
COMMUN	0.15	0.56	0.11	0.13	0.13
MIGRANT	0.03	0.11	0.00	0.00	0.10
TIMEPRAC	2.12	1.47	2.10	2.11	2.24
AGEPRAC	8.60	7.61	10.83	7.68	7.51
FTEMDS	1.37	1.44	1.29	1.29	1.63
NPS	0.07	0.33	0.09	0.02	0.08
PAS	0.22	0.72	0.20	0.10	0.37
PATIENTS	93.79	89.89	95.17	91.84	96.81
NEWPATS	13.33	7.89	10.87	17.42	10.71
ACCEPT	1.00	1.00	1.00	1.00	1.00
HOSPATS	5.97	4.50	5.15	7.14	5.16
PTHRS	52.10	43.50	50.16	53.90	53.37
PERHOURS	4.14	4.13	4.36	4.05	4.00
TELPATS	6.68	6.25	6.47	6.83	6.81
EVENING	0.27	0.75	0.09	0.37	0.23
WEEKEND	0.36	0.00	0.41	0.41	0.29
FEENEW	25.97	31.50	24.73	23.61	31.41
FEEFOFF	16.47	16.38	15.64	16.74	17.17
FEEHOSP	22.25	23.83	21.16	22.07	23.90
PCTBLUE	18.79	19.63	22.10	16.76	17.85
PCTPRIV	24.47	12.63	22.79	21.73	35.86
MEDICARE	31.71	27.78	35.37	33.00	24.63
MEDICAID	20.32	29.56	16.74	23.77	16.03
NOINS	23.12	14.50	19.50	27.38	22.21
DISCT	14.06	18.00	13.30	13.80	14.52
COLLRAT	3.05	2.88	2.73	3.37	2.90

V. SUMMARY

A. OVERVIEW OF THE ANALYSIS OF PHYSICIANS' LOCATION DECISIONS AND PRACTICE PATTERNS

The mission of the National Health Service Corps program is to improve the delivery of health services in HMSAs by the appropriate placement of health professionals and health resources. The purpose of this portion of the study was to evaluate the retention of NHSC alumni in Health Manpower Shortage Areas, to document the distribution of NHSC alumni, Private Practice Option (PPO) physicians, and non-NHSC physicians in rural areas, and to examine the practice patterns (e.g. use of auxiliary personnel, fee structures, patient characteristics) of NHSC alumni, non-alumni, and recent PPOs.

B. INDIVIDUAL PHYSICIANS' LOCATION CHOICES: SUMMARY AND FINDINGS

Using data obtained through a survey of 1974 - 1978 graduates of allopathic and osteopathic schools of medicine who were located in rural areas and were practicing as primary care physicians, the factors which influenced their choice of location were examined descriptively and using multivariate techniques. Specific analytic emphases included:

- o descriptive analysis of personal and professional characteristics of young physicians associated with location choice patterns
- o analysis of the stated preferences of young physicians and associated location choices
- o examination of the effect of prior contacts with rural areas in the location choice
- o multivariate analysis of factors which influenced decisions
  - -- to locate in urban, rather than rural, areas,
  - -- to locate in HMSA rather than non-HMSA areas; and
  - -- for NHSC alumni, to locate in the NHSC site to which they were assigned or to choose another location.

Results of the descriptive analyses indicate that NHSC alumni and non-alumni are different in several ways:

- o NHSC alumni and PPOs report substantially fewer prior contacts with rural areas than do non-alumni; osteopathic physicians report the highest number of prior contact events.

- Alumni are more likely to be female than non-alumni; osteopathic physicians are much less likely to be female.

- Alumni, PPOs, and osteopathic physicians are overwhelmingly U.S. natives; nearly 2 percent of M.D. non-alumni are foreign-born.

- While a high proportion (14%) of alumni are non-white; only 4.67% of PPOs are non-white and only 1.43% of non-alumni are nonwhite.

- Non-alumni are more likely to be married than are alumni; PPOs are least likely to be married.

- Differences by specialty are substantial

  -- the combined general/family practice specialties account for between 66 percent and 87 percent of all physicians in the study, by group.

  -- 20 percent of non-alumni and 15 percent of alumni are internists; both groups have between 8 and 9 percent pediatricians.

- Non-alumni are overwhelmingly (91%) board certified or board eligible compared with 72 percent of alumni, and 63 percent of PPOs; only 57 percent of D.O.s are board-certified or board eligible.

When these characteristics are compared for NHSC alumni and non-alumni, by location of practice in HMSA and non-HMSA counties, a distinct pattern emerges:

- NHSC alumni who locate in non-HMSAs tend to be more similar to non-alumni than to NHSC alumni in HMSAs; specifically, they have more prior contact events, are more likely to be male, are more often foreign born, are less often non-white, less likely to be in GP/FP practice, and somewhat more likely to be board certified and board eligible

- Non-alumni in HMSAs, on the other hand, tend to be slightly more similar to alumni than are non-alumni in non-HMSA practice.

While examination of professional and personal characteristics by type of physician and location of practice reveal that there remain substantial

differences between alumni and non-alumni characteristics the fact that there is some convergence of characteristics within locations suggests that there is a relationship between these characteristics and choice of a HMSA or non-HMSA location.

The examination of the factors which young physicians indicate influenced their location choices suggests

- Young physicians apparently make a location decision in two stages: a set of criteria are used to select a group of communities which are acceptable, then specific factors are examined to select from among this set.
- PPOs indicate a stronger influence of economic factors than do other physicians in choosing a location; but seem to go through a less thorough decision process.
- NHSC alumni who locate in nonHMSAs express preferences which are quite different from those of alumni who locate in HMSAs.

Results of the initial multivariate analysis of individual physicians' location choices suggest that

(1) Satisfaction with the NHSC experience has a positive effect on the probability of locating in a rural area.

(2) The NHSC experience has a positive effect on the probability that a physician will locate in a HMSA.

(3) Early rural prior contact events, unrelated to professional experience, appear to influence young physicians to choose nonHMSA locations -- perhaps because they locate in the specific rural area where they were born and/or reared.

(4) Other personal and professional characteristics of physicians appear to have little or no relationship to the location choices examined.

When factors which physicians indicated were influential on their location choices were included in the HMSA-non-HMSA choice model, results were considerably stronger. Factors which were positively associated with HMSA location choice were:

- o NHSC service
- o GP/FP specialization
- o preferences to locate in a specific community with high medical need
- o preferences for an opportunity to work with a specific institution

Factors which were negatively associated with HMSA choices were:

- o preferences for particular area features of specific communities
- o preference for group practice or partnership arrangements
- o preference for having a hospital and facilities available

Results of the full multivariate analysis of the HMSA-non-HMSA location choice were, in general, consistent with our prior expectations.

C. ANALYSIS OF YOUNG PHYSICIANS' PRACTICE PATTERNS: SUMMARY AND FINDINGS

The focus of this study area was to determine whether the practice patterns of NHSC alumni are different from, or similar to, the practice patterns of young physicians who did not serve in the NHSC. In addition, the practice characteristics of Private Practice Option physicians while fulfilling their NHSC obligation in 1984-85 were examined. Data for this analysis were obtained through the survey of young physicians conducted between October 1984 and January 1985.

Results of the comparison of practice patterns indicate that there are differences between NHSC alumni and non-alumni. Alumni practice patterns include:

- o higher proportions of HMSA patients
- o more Community Health Center and Migrant Health Center practice
- o greater use of nurse practitioners
- o more evening practice hours

- more Medicaid patients
- higher rates of acceptance of assignment for Medicare claims
- more frequent use of sliding fee scales and discounts of fees.

These differences, however, do not appear to be wholly attributable to the NHSC experience. NHSC alumni are somewhat more likely to be in general and family practice, are less frequently board certified, much more likely to practice in an HMSA, and are underrepresented in the South and overrepresented in the West, compared to non-alumni. These differences between the two groups may explain a substantial portion of the practice characteristics differences observed.

Physicians who practice in non-HMSAs exhibit similar practice patterns whether or not they served in the NHSC. However, differences are observed in the practice patterns of alumni and non-alumni who practice in HMSAs. Evidently, for alumni who remain in HMSA practice, some Corps effect appears to have influenced their subsequent practice patterns.

When the practice patterns of PPOs are examined, the findings indicate that:

- The majority of PPOs are in solo and partnership/group practice arrangements.
- PPOs see fewer patients, on average, than do NHSC alumni and non-alumni, but report working more hours.
- About 20 percent of patients seen in all settings are Medicaid beneficiaries.
- PPOs in MHCs see the largest number of patients and work the longest hours.
- Nearly 80 percent of PPOs are GP/FP physicians; although IM and PD physicians report differing practice characteristics, they are a very small fraction of respondents.
- There is little difference between board certified and non-board certified physicians in practice characteristics.
- Although regional differences in practice characteristics are evident, it is unclear to what extent these may be due to differences in distribution of PPOs by setting and specialty.

D. LIMITATIONS OF THIS EVALUATION

Although the analyses conducted during this evaluation are complete and highly focused on the issues identified by the Health Resources and Services Administration, it is important to recognize that this project was not intended to be a comprehensive evaluation of the National Health Service Corps. Instead, it was structured to answer several limited questions?

- o What proportion of NHSC alumni practicing in rural communities, who fulfilled their NHSC obligation in a rural area, remained in that rural area after completing NHSC service?

- o Of all young physicians graduating between 1974 and 1978 who have chosen primary care practice in a rural community, what factors influenced the choice of a specific community? Are there detectable differences in the factors which influenced the location choices of NHSC alumni and non-alumni?

- o Do the practice characteristics of NHSC alumni appear to have been influenced by their exposure to the NHSC? Do alumni and non-alumni report different practice characteristics?

- o What characteristics of rural communities distinguish counties which are attractive to young physicians from those counties which do not attract physicians? Are rural counties which are attractive to NHSC alumni different from counties which are attractive to non-alumni?

The answers to these questions provide considerable information on the impact of the National Health Service Corps in increasing the permanent availability of medical care to residents of non-metropolitan areas. This evaluation does not address, however, the broader issue of overall NHSC alumni retention in Health Manpower Shortage Areas.

Two other limitations should also be noted.

(1) PPOs who were included in this study began fulfilling their NHSC obligations prior to 1984. Subsequent to that time, there has been considerable change in the guidelines for PPO practice and in the HMSA opportunity list. Consequently, the location patterns and practice characteristics of PPOs serving in 1984 and later may be quite different from the findings reported here for PPOs.

(2) The analyses of location choices and practice characteristics of individual physicians exclude those survey respondents who located in part-HMSAs, when comparisons were being made between HMSAs and non-HMSAs, because there was insufficient information on the within-county locations of individual physicians to determine whether they are in a HMSA or non-HMSA area.

Within these limitations, this evaluation provides much new information on location choices and practice patterns of young physicians.

E. DISCUSSION

The evaluation of National Health Service Corps Alumni retained in Health Manpower Shortage Areas has produced several findings which have significant policy implications. These include:

- NHSC alumni, who practice in rural areas, are much more likely to permanently locate in a HMSA than are non-alumni
- The NHSC experience and NHSC alumni's satisfaction with their service has a significant effect on physicians' decisions to locate in a rural area. NHSC service is a significant factor in explaining the choice between a rural non-HMSA and rural HMSA location.
- NHSC alumni retained in HMSAs practice in ways which increase access to care. They see more Medicaid patients, use sliding fee scales, accept assignment for Medicare claims more frequently, and in other ways continue to offer services which may alleviate existing physician shortages.

The major conclusion for this evaluation is that the National Health Service Corps has had an impact on the distribution of physician services in rural areas. Young physicians who fulfill an NHSC obligation in a rural HMSA and who remain in rural practice are very likely to choose to practice in a HMSA. This is true even though NHSC alumni are less likely than non-alumni to have had any prior exposure to rural areas. In addition, NHSC alumni in HMSAs retain many of the practice patterns which are evident in NHSC sites and, consequently, may be more accessible to low income and working class populations in these areas.

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APPENDIX A

Survey Instruments

SURVEY OF PHYSICIANS' LOCATION DECISIONS

INSTRUCTIONS

We have designed this questionnaire to be quick and easy to answer. It should take between 15 and 20 minutes to complete.

These questions require only the circling of numbers to indicate responses, entering numbers in boxes, or writing the name of a city, county and state. Some questions have instructions which will tell you to circle as many responses as are applicable, or to circle only one response. Some responses have instructions beside them directing you to skip ahead to the next appropriate question.

When you have completed the questionnaire, please place it in the enclosed postage-paid envelope and mail it immediately to Mathematica Policy Research, Suite 550, 600 Maryland Avenue, S.W., Washington, D.C. 20024.

OMB Clearance No. 0915-0087

1. Suppose you could practice medicine wherever you wanted in the United States. Please use the map below and indicate where you would most like to and least like to practice.

	CIRCLE ONE Most like to practice	CIRCLE ONE Least like to practice
PACIFIC NORTHWEST	1	1
PACIFIC SOUTHWEST	2	2
NORTH CENTRAL	3	3
SOUTHWEST	4	4
PLAINS	5	5
GREAT LAKES	6	6
SOUTH	7	7
MIDDLE ATLANTIC	8	8
NEW YORK/NEW JERSEY	9	9
NEW ENGLAND	10	10

2. When did you decide to locate your practice in the community in which you currently practice?

	CIRCLE ONE
BEFORE MEDICAL SCHOOL.....	1
DURING MEDICAL SCHOOL.....	2
DURING INTERNSHIP, RESIDENCY, OR OTHER HOUSE STAFF TRAINING.....	3
OTHER (SPECIFY) _____	4

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3. Listed below is a group of factors which may be important to physicians when they decide where to locate their practices.

We are interested in obtaining information on the process through which you decided to locate your practice in your current community. The structure of this question assumes the decision was made in two stages:

(1) You identified several communities which met your minimum criteria for a practice location.

(2) You selected a specific community--from among the larger group--based on specific characteristics of that community.

Please indicate in the first column below which of these factors were especially important to you when you were identifying communities which you believe met your general location requirements. In the second column below, circle those factors which determined your final selection of the specific community in which you are now practicing.

	CIRCLE ALL THAT APPLY	
	TYPE OF COMMUNITY	SPECIFIC COMMUNITY
a. Income potential	1	1
b. Climate or geographic features of area	1	1
c. Having been brought up in such a community . .	1	1
d. Payment of "forgiveness loan".	1	1
e. Influence of wife or husband (her/his desires, career, etc.)	1	1
f. Influence of family or friends	1	1
g. High medical need in area.	1	1
h. Influence of preceptorship program	1	1
i. Having gone through medical school internship, residency, or military service near here . . .	1	1
j. Advice of older physician.	1	1
k. Organized efforts of community to recruit physicians	1	1
l. Opportunities for social life.	1	1
m. Recreational and sports facilities	1	1
n. Quality of educational system for children . .	1	1
o. Prospect of being more influential in community affairs.	1	1
p. Cultural advantages.	1	1
q. Prosperity of community.	1	1
r. Preference for urban or rural living	1	1
s. Availability of hospital facilities and personnel.	1	1
t. Availability of good social service, welfare, or home care services.	1	1
u. Opportunity for regular contact with a medical school or medical center	1	1
v. Opportunity for regular contact with other physicians	1	1
w. Opportunity to join desirable partnership or group practice.	1	1
x. Availability of loans for beginning practice .	1	1
y. Opportunity to work with specific institution.	1	1
z. Access to continuing medical education	1	1

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4. From all the factors circled above in question 3, choose the three that were most important in attracting you to the general type of community where you located your practice.

RANK		WRITE LETTER OF MOST IMPORTANT FACTORS: LETTER
MOST IMPORTANT	1	☐
SECOND IN IMPORTANCE .	2	☐
THIRD IN IMPORTANCE. .	3	☐

5. From all the factors circled in question 3, choose the three that were most important in attracting you to the specific community you selected.

RANK		WRITE LETTER OF MOST IMPORTANT FACTORS: LETTER
MOST IMPORTANT	1	☐
SECOND IN IMPORTANCE .	2	☐
THIRD IN IMPORTANCE. .	3	☐

6. Did you serve in the National Health Service Corps? Past service as a Private Practice Option physician should be included as service in the NHSC.

YES..... 1 ⟶ GO TO NEXT QUESTION
NO..... 2 ⟶ GO TO Q.11

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7. Are you currently practicing in the same county that you served in as a member of the NHSC?

YES..... 1 ⟶ GO TO NEXT QUESTION
NO..... 2 ⟶ GO TO Q.10

8. Did your service in the NHSC influence your decision to practice in the same county?

YES..... 1 ⟶ GO TO NEXT QUESTION
NO..... 2 ⟶ GO TO Q.10

9. Please explain how your NHSC service affected your decision.

_____

_____

_____ ☐☐

10. How would you rate your experience during your service in the NHSC? Would you say you were very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied, with each of the following factors?

CIRCLE ONE NUMBER FOR EACH ITEM BELOW

	VERY SATISFIED	SOMEWHAT SATISFIED	SOMEWHAT DISSATISFIED	VERY DIS-SATISFIED
a. Professional interaction with other physicians	1	2	3	4
b. Opportunity for regular contact with a medical school or medical center . .	1	2	3	4
c. Access to continuing medical education .	1	2	3	4
d. Availability of hospital support facilities and personnel.	1	2	3	4
e. Opportunities for social and recreational activities	1	2	3	4
f. Availability of good social service, welfare, or home care services. . . .	1	2	3	4

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11. What is your primary specialty?

CIRCLE ONE

GENERAL PRACTICE..... 1
FAMILY PRACTICE..... 2
INTERNAL MEDICINE..... 3
PEDIATRICS..... 4
OTHER SPECIALTY (SPECIFY) _____
_____ 5

12. What is your secondary specialty?

CIRCLE ONE

GENERAL PRACTICE..... 1
FAMILY PRACTICE..... 2
INTERNAL MEDICINE..... 3
PEDIATRICS..... 4
OTHER SPECIALTY (SPECIFY) _____
_____ 5

NO SECONDARY SPECIALTY..... 6

13. Are you Board Certified in your primary specialty?

YES..... 1
NO, BUT BOARD ELIGIBLE....2
NO..... 3

14. Where (is/are) your current practice(s) located? For each location, please indicate whether it is a primary or secondary practice.

			PRIMARY PRACTICE		SECONDARY PRACTICE	
			YES	NO	YES	NO
_____	_____	_____	1	2	1	2
CITY	COUNTY	STATE				
_____	_____	_____	1	2	1	2
CITY	COUNTY	STATE				
_____	_____	_____	1	2	1	2
CITY	COUNTY	STATE				

15. Are you currently practicing in a Community Health Center or Migrant Health Center?

CIRCLE ALL THAT APPLY

YES, COMMUNITY HEALTH CENTER..... 1
YES, MIGRANT HEALTH CENTER..... 1
} ⟶ GO TO NEXT QUESTION

NO..... 1 ⟶ GO TO Q.17

16. Is this your primary practice?

YES..... 1
NO..... 2

17. How would you classify your primary practice?

CIRCLE ONE

SELF: SOLO PRACTICE (1 M.D.)..... 1
SELF: PARTNERSHIP PRACTICE (2 M.D.s).... 2
ARRANGEMENT WITH OTHER PHYSICIANS:
NON-GROUP..... 3
GROUP PRACTICE (3 or MORE M.D.s)..... 4
OTHER (SPECIFY) _____ 5

18. Excluding yourself, how many physicians work full-time (40 hours or more per week) and how many work part-time (less than 40 hours per week) at this practice?

IF NONE, CIRCLE 0

FULL-TIME PHYSICIANS [ ][ ]
NONE..... 0

PART-TIME PHYSICIANS [ ][ ]
NONE..... 0

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19. How many Physician's Assistants work full-time and how many work part-time at this practice?

IF NONE, CIRCLE 0

FULL-TIME ☐☐

NONE..... 0

PART-TIME ☐☐

NONE..... 0

20. How many Nurse Practitioners work full-time and how many work part-time at this practice?

IF NONE, CIRCLE 0

FULL-TIME ☐☐

NONE..... 0

PART-TIME ☐☐

NONE..... 0

21. How many years and months have you worked at this practice?

☐ YEARS + ☐☐ MONTHS

22. How many years and months has this practice been in existence?

☐☐ YEARS + ☐☐ MONTHS

23. Do you provide any direct patient care?

YES..... 1 ⟶ GO TO NEXT QUESTION

NO..... 2 ⟶ GO TO Q.45, PAGE 11

24. During your last full work week, how many patients did you see in the office at your primary practice? Do not include patients seen solely by nurse practitioners.

PATIENTS ☐☐☐

25. How many of those patients were new to this practice?

IF NONE, CIRCLE ZERO

NEW PATIENTS ☐☐☐ ⟶ GO TO Q.27

NONE..... 0 ⟶ GO TO NEXT QUESTION

26. Is this practice accepting new patients?

YES..... 1

NO..... 2

27. Excluding patients in nursing homes, how many patients did you have in hospitals during your last complete work week?

IF NONE, CIRCLE ZERO

HOSPITAL PATIENTS ☐☐☐

NONE..... 0

28. During your last full work week, how many <u>hours</u> did you spend in the office at your primary practice?

HOURS IN OFFICE ☐☐☐

29. How many hours were spent with patients?

HOURS WITH PATIENTS ☐☐☐

30. How many patients do you usually see per hour?

PATIENTS PER HOUR ☐☐

31. How many patients do you consult with by telephone on an average day?

IF NONE, CIRCLE 0

PATIENTS BY TELEPHONE ☐☐

NONE..... 0

32. During the last twelve months, how many weeks did you work in the office?

WEEKS ☐☐

33. Do you hold regularly scheduled office hours in the evenings and on weekends?

CIRCLE ALL THAT APPLY

YES, EVENINGS..... 1

YES, WEEKENDS..... 1

NO..... 1

34. In what counties and states do most of your regular patients live?

WRITE IN NAMES OF THE COUNTIES AND STATES

	COUNTY	STATE
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____
e.	_____	_____

35. What is your current fee for each of the following treatments?

a. A new patient exam $ ☐☐☐

b. A routine medical follow-up visit in your office $ ☐☐☐

c. A follow-up medical visit in the hospital on the day after a patient is admitted $ ☐☐☐

36. About what percentage of your patients ...

IF NONE, ENTER ZERO

a. have Blue Shield? ☐☐☐ %

b. have other private health insurance plans that pay for office visits? ☐☐☐ %

c. have no private or government coverage at all for physicians services in the office? ☐☐☐ %

(TOTAL DOES NOT NEED TO ADD TO 100%)

37. What percentage of your patients are Medicare beneficiaries?

IF NONE, CIRCLE 0

MEDICARE BENEFICIARIES ☐☐☐ %

NONE..... 0

38. Have you chosen to sign up as a Medicare participating physician?

YES..... 1

NO..... 2

39. About what percentage of your patients are Medicaid beneficiaries?

IF NONE, CIRCLE 0

MEDICAID BENEFICIARIES ☐☐☐ %

NONE..... 0

40. Do you accept new Medicaid patients?

YES..... 1 ---> GO TO NEXT QUESTION

NO..... 2 ---> GO TO Q.42

41. How often do you use a "sliding fee scale," that is, a fee schedule that varies depending on the economic situation of the patient?

CIRCLE ONE

ALWAYS..... 1
OFTEN..... 2
SELDOM..... 3
NEVER..... 4

42. During the last 12 months, about what percentage of your patients did you charge less than your standard fee (or no charge)?

IF NONE, CIRCLE 0

DISCOUNTED CHARGES ☐☐☐ % ——> GO TO NEXT QUESTION
NONE..... 0 ——> GO TO Q.44

43. During the last 12 months, what is your best estimate of the total value of all these discounted charges?

DOLLARS $ ☐☐,☐☐☐

44. During the last 12 months, about what percentage of <u>all</u> your patient billings would you say have been collected so far?

CIRCLE ONE

96% - 100%..... 1
90% - 95%..... 2
80% - 89%..... 3
LESS THAN 80%..... 4

These last few questions are about geographic and demographic information.

45. In what city, county, and state were you born?

_____ CITY _____ COUNTY _____ STATE

46. Where did you reside primarily until you were 18 years of age?

_____ CITY _____ COUNTY _____ STATE

47. Where is the college or university located from which you received your bachelor's degree?

CITY	COUNTY	STATE
_____	_____	_____

48. Where is the college or university located from which you received your medical degree?

CITY	COUNTY	STATE
_____	_____	_____

49. Did you serve your residency at more than one location?

YES..... 1 ⟶ GO TO Q.51
NO..... 2 ⟶ GO TO NEXT QUESTION

50. Where did you serve your residency?

CITY	COUNTY	STATE	
_____	_____	_____	⟶ GO TO Q.53

51. In what city, county and state did you serve the longest time of your residency?

CITY	COUNTY	STATE
_____	_____	_____

52. What was the last location you served in during your residency?

CITY	COUNTY	STATE
_____	_____	_____

53. Are you a male or female?

CIRCLE ONE

MALE..... 1
FEMALE..... 2

54. Are you a native born or naturalized citizen of the United States?

CIRCLE ONE

YES, NATIVE BORN..... 1
YES, NATURALIZED CITIZEN..... 2
NO, FOREIGN BORN, NOT NATURALIZED..... 3

55. Are you . . .

CIRCLE ONE

WHITE (NON-HISPANIC)..... 1
BLACK (NON-HISPANIC)..... 2
HISPANIC..... 3
AMERICAN INDIAN..... 4
ASIAN OR PACIFIC ISLANDER. 5

56. What is your marital status?

CIRCLE ONE

NOW MARRIED..... 1 ——> GO TO NEXT QUESTION

WIDOWED..... 2
DIVORCED..... 3
SEPARATED..... 4
NEVER MARRIED..... 5

} YOU HAVE COMPLETED THE QUESTIONNAIRE. PLEASE MAIL IN YOUR SURVEY RIGHT AWAY.

THANK YOU!

57. Is your spouse currently enrolled in school?

YES..... 1 ——> GO TO NEXT QUESTION
NO..... 2 ——> GO TO Q.59

58. What type of school is it?

CIRCLE ONE

GRADUATE OR PROFESSIONAL SCHOOL..... 1
COLLEGE..... 2
TECHNICAL SCHOOL..... 3
HIGH SCHOOL..... 4
OTHER..... 5

59. What is the highest grade or year of school ever attended by your spouse?

CIRCLE ONE

GRADUATE OR PROFESSIONAL DEGREE..... 1
SOME GRADUATE OR PROFESSIONAL SCHOOL..... 2
COLLEGE GRADUATE..... 3 } ——> GO TO NEXT QUESTION
SOME COLLEGE..... 4
TECHNICAL SCHOOL..... 5
HIGH SCHOOL GRADUATE..... 6
SOME HIGH SCHOOL..... 7
ELEMENTARY EDUCATION..... 8 } ——> GO TO Q.62
NONE..... 9
DON'T KNOW..... 10

60. Did your spouse receive a degree from the program indicated in Q.59?

YES..... 1 ——> GO TO NEXT QUESTION
NO..... 2 ——> GO TO Q.62

61. What type of degree was it?

CIRCLE ONE

ASSOCIATE..... 1
BACHELOR..... 2
MASTERS..... 3
DOCTORATE..... 4
PROFESSIONAL (SPECIFY) _____ 5
OTHER (SPECIFY) _____ 6

62. Does your spouse currently work for pay outside the home?

CIRCLE ONE

FULL-TIME..... 1

PART-TIME..... 2

UNEMPLOYED..... 3

NOT WORKING..... 4

63. Did your spouse make a change in career or profession as a result of your decision to set up your current practice at this location?

YES..... 1

NO..... 2

64. Where did your spouse reside primarily until 18 years of age?

_____ CITY _____ COUNTY _____ STATE

YOU HAVE COMPLETED THE QUESTIONNAIRE.
PLEASE MAIL IN YOUR SURVEY RIGHT AWAY.
THANK YOU!

PPO

SURVEY OF PHYSICIANS' LOCATION DECISIONS

INSTRUCTIONS

We have designed this questionnaire to be quick and easy to answer. It should take between 15 and 20 minutes to complete.

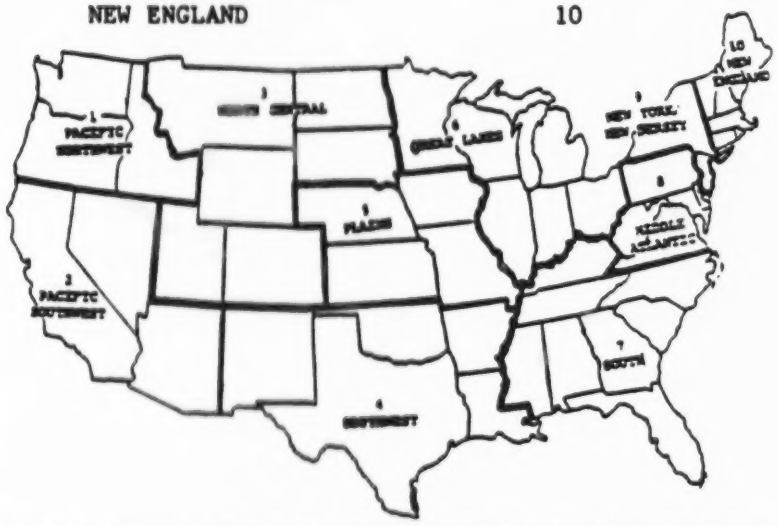
These questions require only the circling of numbers to indicate responses, entering numbers in boxes, or writing the name of a city, county and state. Some questions have instructions which will tell you to circle as many responses as are applicable, or to circle only one response. Some responses have instructions beside them directing you to skip ahead to the next appropriate question.

When you have completed the questionnaire, please place it in the enclosed postage-paid envelope and mail it immediately to Mathematica Policy Research, Suite 550, 600 Maryland Avenue, S.W., Washington, D.C. 20024.

OMB Clearance No. 0915-0087

1. Suppose you could practice medicine wherever you wanted in the United States. Please use the map below and indicate where you would most like to and least like to practice.

	CIRCLE ONE Most like to practice	CIRCLE ONE Least like to practice
PACIFIC NORTHWEST	1	1
PACIFIC SOUTHWEST	2	2
NORTH CENTRAL	3	3
SOUTHWEST	4	4
PLAINS	5	5
GREAT LAKES	6	6
SOUTH	7	7
MIDDLE ATLANTIC	8	8
NEW YORK/NEW JERSEY	9	9
NEW ENGLAND	10	10



2. When did you decide to locate your practice in the community in which you currently practice?

CIRCLE ONE

BEFORE MEDICAL SCHOOL..... 1
DURING MEDICAL SCHOOL..... 2
DURING INTERNSHIP, RESIDENCY, OR OTHER HOUSE STAFF TRAINING..... 3 —> GO TO NEXT QUESTION
ASSIGNED BY NHSC..... 4 —> GO TO Q.6
OTHER (SPECIFY) _____ 5 —> GO TO NEXT QUESTION

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3. Listed below is a group of factors which may be important to physicians when they decide where to locate their practices.

We are interested in obtaining information on the process through which you decided to locate your PPO practice in your current community. The structure of this question assumes the decision was made in two stages:

(1) You identified several communities which met your minimum criteria for a practice location.

(2) You selected a specific community--from among the larger group--based on specific characteristics of that community.

Please indicate in the first column below which of these factors were especially important to you when you were identifying communities which you believe met your general location requirements. In the second column below, circle those factors which determined your final selection of the specific community in which you are now practicing.

CIRCLE ALL THAT APPLY

	TYPE OF COMMUNITY	SPECIFIC COMMUNITY
a. Income potential	1	1
b. Climate or geographic features of area	1	1
c. Having been brought up in such a community	1	1
d. Payment of "forgiveness loan"	1	1
e. Influence of wife or husband (her/his desires, career, etc.)	1	1
f. Influence of family or friends	1	1
g. High medical need in area	1	1
h. Influence of preceptorship program	1	1
i. Having gone through medical school internship, residency, or military service near here	1	1
j. Advice of older physician	1	1
k. Organized efforts of community to recruit physicians	1	1
l. Opportunities for social life	1	1
m. Recreational and sports facilities	1	1
n. Quality of educational system for children	1	1
o. Prospect of being more influential in community affairs	1	1
p. Cultural advantages	1	1
q. Prosperity of community	1	1
r. Preference for urban or rural living	1	1
s. Availability of hospital facilities and personnel	1	1
t. Availability of good social service, welfare, or home care services	1	1
u. Opportunity for regular contact with a medical school or medical center	1	1
v. Opportunity for regular contact with other physicians	1	1
w. Opportunity to join desirable partnership or group practice	1	1
x. Availability of loans for beginning practice	1	1
y. Opportunity to work with specific institution	1	1
z. Access to continuing medical education	1	1

4. From all the factors circled above in question 3, choose the three that were most important in attracting you to the general type of community where you located your practice.

RANK		WRITE LETTER OF MOST IMPORTANT FACTORS: LETTER
MOST IMPORTANT	1	☐
SECOND IN IMPORTANCE .	2	☐
THIRD IN IMPORTANCE. .	3	☐

5. From all the factors circled in question 3, choose the three that were most important in attracting you to the specific community you selected.

RANK		WRITE LETTER OF MOST IMPORTANT FACTORS: LETTER
MOST IMPORTANT	1	☐
SECOND IN IMPORTANCE .	2	☐
THIRD IN IMPORTANCE. .	3	☐

6. Will your service in the NHSC influence your decision to practice in the same county?

YES..... 1 ——> GO TO NEXT QUESTION
NO..... 2 ——> GO TO Q.8

7. Please explain how your NHSC service will affect your decision.

_____
_____
_____ ☐☐

8. How would you rate your experience during your service as a PPO? Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied, with each of the following factors?

CIRCLE ONE NUMBER FOR EACH ITEM BELOW

	VERY SATISFIED	SOMEWHAT SATISFIED	SOMEWHAT DISSATISFIED	VERY DIS-SATISFIED
a. Professional interaction with other physicians	1	2	3	4
b. Opportunity for regular contact with a medical school or medical center . .	1	2	3	4
c. Access to continuing medical education .	1	2	3	4
d. Availability of hospital support facilities and personnel.	1	2	3	4
e. Opportunities for social and recreational activities	1	2	3	4
f. Availability of good social service, welfare, or home care services. . . .	1	2	3	4

9. What is your primary specialty?

CIRCLE ONE

GENERAL PRACTICE..... 1
FAMILY PRACTICE..... 2
INTERNAL MEDICINE..... 3
PEDIATRICS..... 4
OTHER SPECIALTY (SPECIFY) _____ 5

10. What is your secondary specialty?

CIRCLE ONE

GENERAL PRACTICE..... 1
FAMILY PRACTICE..... 2
INTERNAL MEDICINE..... 3
PEDIATRICS..... 4
OTHER SPECIALTY (SPECIFY) _____ 5
NO SECONDARY SPECIALTY..... 6

11. Are you Board Certified in your primary specialty?

YES..... 1
NO, BUT BOARD ELIGIBLE.... 2
NO..... 3

12. Where (is/are) your current practice(s) located? For each location, please indicate whether it is a primary location or satellite clinic.

			PRIMARY PRACTICE		SATELLITE CLINIC	
			YES	NO	YES	NO
_____ CITY	_____ COUNTY	_____ STATE	1	2	1	2
_____ CITY	_____ COUNTY	_____ STATE	1	2	1	2
_____ CITY	_____ COUNTY	_____ STATE	1	2	1	2

13. Are you currently practicing in a Community Health Center or Migrant Health Center?

CIRCLE ALL THAT APPLY

YES, COMMUNITY HEALTH CENTER..... 1
YES, MIGRANT HEALTH CENTER..... 1
} ——> GO TO NEXT QUESTION

NO..... 1 ——> GO TO Q.14

14. How would you classify your practice?

CIRCLE ONE

SELF: SOLO PRACTICE (1 M.D.)..... 1

SELF: PARTNERSHIP PRACTICE (2 M.D.s).... 2

ARRANGEMENT WITH OTHER PHYSICIANS:
NON-GROUP..... 3

GROUP PRACTICE (3 or MORE M.D.s)..... 4

OTHER (SPECIFY) _____ 5

15. Excluding yourself, how many physicians work full-time (40 hours or more per week) and how many work part-time (less than 40 hours per week) at this practice?

IF NONE, CIRCLE 0

FULL-TIME PHYSICIANS ☐☐

NONE..... 0

PART-TIME PHYSICIANS ☐☐

NONE..... 0

16. How many Physician's Assistants work full-time and how many work part-time at this practice?

IF NONE, CIRCLE 0

FULL-TIME ☐☐

NONE..... 0

PART-TIME ☐☐

NONE..... 0

17. How many Nurse Practitioners work full-time and how many work part-time at this practice?

IF NONE, CIRCLE 0

FULL-TIME ☐☐

NONE..... 0

PART-TIME ☐☐

NONE..... 0

18. How many years and/or months have you worked at this practice?

☐ + ☐☐

YEARS MONTHS

19. How many years and months has this practice been in existence?

☐☐ + ☐☐

YEARS MONTHS

20. During your last full work week, how many patients did you see in the office at your primary location? Do not include patients seen solely by nurse practitioners.

PATIENTS ☐☐☐

21. How many of those patients were new to this practice?

IF NONE, CIRCLE ZERO

NEW PATIENTS ☐☐☐ —> GO TO Q.23

NONE..... 0 —> GO TO NEXT QUESTION

22. Is this practice accepting new patients?

YES..... 1

NO..... 2

23. Excluding patients in nursing homes, how many patients did you have in hospitals during your last complete work week?

IF NONE, CIRCLE ZERO

HOSPITAL PATIENTS ☐☐☐

NONE..... 0

24. During your last full work week, how many hours were spent with patients?

HOURS WITH PATIENTS ☐☐☐

25. How many patients do you usually see per hour?

PATIENTS PER HOUR ☐☐

26. How many patients do you consult with by telephone on an average day?

IF NONE, CIRCLE 0

PATIENTS BY TELEPHONE ☐☐

NONE..... 0

27. Do you hold regularly scheduled office hours in the evenings and on weekends?

CIRCLE ALL THAT APPLY

YES, EVENINGS..... 1

YES, WEEKENDS..... 1

NO..... 1

28. In what counties and states do most of your regular patients live?

WRITE IN NAMES OF THE COUNTIES AND STATES

	COUNTY	STATE
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____
e.	_____	_____

29. What is your current fee for each of the following treatments?

a.	A new patient exam	$ ☐☐☐
b.	A routine medical follow-up visit in your office	$ ☐☐☐
c.	A follow-up medical visit in the hospital on the day after a patient is admitted	$ ☐☐☐

30. About what percentage of your patients ...

IF NONE, ENTER ZERO

a.	have Blue Shield?	☐☐☐ %
b.	have other private health insurance plans that pay for office visits?	☐☐☐ %
c.	have <u>no</u> private or government coverage at all for physicians services in the office?	☐☐☐ %

(TOTAL DOES NOT NEED TO ADD TO 100%)

31. What percentage of your patients are Medicare beneficiaries?

IF NONE, CIRCLE 0

MEDICARE BENEFICIARIES ☐☐☐ %

NONE..... 0

32. About what percentage of your patients are Medicaid beneficiaries?

IF NONE, CIRCLE 0

MEDICAID BENEFICIARIES ☐☐☐ %

NONE..... 0

33. During the last 12 months, about what percentage of your patients did you charge less than your standard fee (or no charge)?

IF NONE, CIRCLE 0

DISCOUNTED CHARGES ☐☐☐ % ——> GO TO NEXT QUESTION

NONE..... 0 ——> GO TO Q.35

34. During the last 12 months, what is your best estimate of the total value of all these discounted charges?

DOLLARS $ ☐☐,☐☐☐

35. During the last 12 months, about what percentage of <u>all</u> your patient billings would you say have been collected so far?

CIRCLE ONE

96% - 100%..... 1

90% - 95%..... 2

80% - 89%..... 3

LESS THAN 80%..... 4

These last few questions are about geographic and demographic information.

36. In what city, county, and state were you born?

_____	_____	_____
CITY	COUNTY	STATE

37. Where did you reside primarily until you were 18 years of age?

_____	_____	_____
CITY	COUNTY	STATE

38. Where is the college or university located from which you received your bachelor's degree?

_____	_____	_____
CITY	COUNTY	STATE

39. Where is the college or university located from which you received your medical degree?

_____	_____	_____
CITY	COUNTY	STATE

40. Did you serve your residency at more than one location?

YES..... 1 ——> GO TO Q.42
NO..... 2 ——> GO TO NEXT QUESTION

41. Where did you serve your residency?

_____	_____	_____	
CITY	COUNTY	STATE	——> GO TO Q.44

42. In what city, county and state did you serve the longest time of your residency?

CITY	COUNTY	STATE
_____	_____	_____

43. What was the last location you served in during your residency?

CITY	COUNTY	STATE
_____	_____	_____

44. Are you a male or female?

CIRCLE ONE

MALE..... 1
FEMALE..... 2

45. Are you a native born or naturalized citizen of the United States?

CIRCLE ONE

YES, NATIVE BORN..... 1
YES, NATURALIZED CITIZEN..... 2
NO, FOREIGN BORN, NOT NATURALIZED..... 3

46. Are you . . .

CIRCLE ONE

WHITE (NON-HISPANIC)..... 1
BLACK (NON-HISPANIC)..... 2
HISPANIC..... 3
AMERICAN INDIAN..... 4
ASIAN OR PACIFIC ISLANDER. 5

47. What is your marital status?

CIRCLE ONE

NOW MARRIED..... 1 ——> GO TO NEXT QUESTION

WIDOWED..... 2 | YOU HAVE COMPLETED
DIVORCED..... 3 | THE QUESTIONNAIRE.
SEPARATED..... 4 | PLEASE MAIL IN YOUR
NEVER MARRIED..... 5 | SURVEY RIGHT AWAY.
THANK YOU!

48. Is your spouse currently enrolled in school?

YES..... 1 ——> GO TO NEXT QUESTION
NO..... 2 ——> GO TO Q.50

49. What type of school is it?

CIRCLE ONE

GRADUATE OR PROFESSIONAL SCHOOL..... 1
COLLEGE..... 2
TECHNICAL SCHOOL..... 3
HIGH SCHOOL..... 4
OTHER..... 5

50. What is the highest grade or year of school ever attended by your spouse?

CIRCLE ONE

GRADUATE OR PROFESSIONAL DEGREE..... 1
SOME GRADUATE OR PROFESSIONAL SCHOOL..... 2
COLLEGE GRADUATE..... 3 ——> GO TO NEXT QUESTION
SOME COLLEGE..... 4
TECHNICAL SCHOOL..... 5
HIGH SCHOOL GRADUATE..... 6
SOME HIGH SCHOOL..... 7
ELEMENTARY EDUCATION..... 8 ——> GO TO Q.53
NONE..... 9
DON'T KNOW..... 10

51. Did your spouse receive a degree from the program indicated in Q.50?

YES..... 1 ——> GO TO NEXT QUESTION
NO..... 2 ——> GO TO Q.53

52. What type of degree was it?

CIRCLE ONE

ASSOCIATE..... 1
BACHELOR..... 2
MASTERS..... 3
DOCTORATE..... 4
PROFESSIONAL (SPECIFY) _____ 5
OTHER (SPECIFY) _____ 6

53. Does your spouse currently work for pay outside the home?

CIRCLE ONE

FULL-TIME..... 1
PART-TIME..... 2
UNEMPLOYED..... 3
NOT WORKING..... 4

54. Did your spouse make a change in career or profession as a result of your decision to set up your current practice at this location?

YES..... 1
NO..... 2

55. Where did your spouse reside primarily until 18 years of age?

_____ CITY _____ COUNTY _____ STATE

YOU HAVE COMPLETED THE QUESTIONNAIRE.
PLEASE MAIL IN YOUR SURVEY RIGHT AWAY.
THANK YOU!

APPENDIX B

Results of Initial Multivariate Analysis
of Individual Physicians' Location Decisions

APPENDIX B

RESULTS OF MULTIVARIATE ANALYSIS OF
INDIVIDUAL PHYSICIANS' LOCATION DECISIONS[a]

Explanatory Variables	CHOICE 1: Urban-Rural	CHOICE 2: HMSA - Non-HMSA					CHOICE 3: HMSA Retention
	1979 NHSC Alumni	All Physicians	Non-Alumni	NHSC Alumni	M.D.s	D.O.s	All NHSC Alumni
INTERCEPT	-1.89	-1.03*	-1.77*	4.59*	0.66	-0.66	-.58
YRGRAD	0.16	--	0.09	--	--	--	--
TIMING	0.15	0.40	0.27	--	0.35	0.62	--
SEX	-0.49	-0.24	-0.17	-.88	-0.25	5.26	0.22
RACE	0.14	0.07	--	-.62	-0.20	0.17	-.04
SPOUSED	-0.51	-0.33	-0.45*	.26	-0.40*	0.05	0.67
PERSEVT	0.08*	-0.13	-0.12	-.07	-0.15*	0.11	0.31
PROFEVT	0.30	-0.36	-0.09	-1.35	-0.83	--	-0.42
GPFP	--	0.58*	0.66*	-0.12	0.59*	3.48*	0.47
DO	0.54	0.19	-0.03	1.64	--	--	-0.35
NHSC	--	2.80	--	--	2.72	--	--
NHSCSITE	-0.00	--	--	0.00	--	--	-0.00*
NHSCMD	0.89	--	--	-0.01	--	--	0.11
NHSCHOSP	0.01*	--	--	-1.44	--	--	0.28*
POPDENS	1.15	--	--	0.01	--	--	0.08
SATISFAC	--	--	--	0.31	--	--	--
OTHMD	--	--	--	--	--	--	-.99
MEDSCH	--	--	--	--	--	--	-.36
CME	--	--	--	--	--	--	-1.01
HOSPFAC	--	--	--	--	--	--	0.22
SOCREC	--	--	--	--	--	--	0.17
WELFARE	--	--	--	--	--	--	0.76
R^2	0.00	.17	0.00	0.00	.18	.033	0.00
Number of Cases	108	594	474	161	515	79	111

*Significant at the P < .10 level.

[a]Physicians who located in part-HMSAs were excluded from this analysis.

BHPr
U.S. DEPARTMENT OF
HEALTH & HUMAN SERVICES
Public Health Service
Health Resources and Services Administration

Bureau of Health Professions
ODAM Report No. 4-86